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Provisional SPECIFICATION
PROVISIONAL APPLICATION for a Patent

HELIX BIO TOWER – power generator utilizing energy from the sun, the wind and waste heat from buildings as well as using power converted from waste matter in urban environments.

The following statement is a full description of this invention, including the best method of performing it known to me:

HELIX BIO TOWER
Provisional Patent

Applicant and designer: Steven Kenessey

This application is an extension of two previous provisional patent applications titled "Eco Tower" "Bio Tower" and "Bio Power Tower", by the same designer. Much of the contents of this application was covered in the previous applications mentioned above has been included as it relates to the additional aspects of this same invention.

Solving the problem of global warming is know among the scientific community as well as the community at large one of the major challenges of our time. The use of solar energy to lessen the need for greenhouse gas producing methods of electricity generation is one aspect that is contributing to the solving of this problem.

These problems are addressed by the present invention, which provides a novel method of utilizing solar radiation to capture the sun's heat, promote organic life for the production of energy, transfer energy and filter and regulate the amount of solar energy entering man made structures in such a way that the energy filtered in the process may be converted to electrcity.

The Bio Tower is normally one or a combination of various aspects with the purpose of creating air movement that can be converted into electricity, as well as, if desired, exhaust polluted air from urban environments and also if desired, purify downward moving air.
The Bio Tower may be built at any appropriate scale.
A small scale, wind driven version of the helix type versions of BoTower may be used to pump air.

The Bio Tower may preferably be used to exhaust used air and generate electricity from places such as city centres by utilising heat from air conditioning systems in surrounding buildings and/or from the sun's energy and/or by harnessing the energy of the wind.
This current invention includes the additional aspects:
-conversion of waste material (mostly sewage and waste paper and other organic waste) into bio gas (consisting mostly of methane gas) and into heat and into fertilizer. The heat released by any of these processes may preferably be used to augment the system;
-the bio gas thus created may then be stored and used to power direct fuel cells, which produces heat and electricity. The heat generated in this process may be used to augment the functioning of the Bio Tower and the electrical power generated may preferably be used to augment the electrical power output of the Bio Tower's turbines as well as provide electrical power when the electrical output of the same turbines is low. Preferably the said fuel cell will incorporate a turbine for the production of additional electricity before the waste heats is used to augment the functioning of the tower;
-use of heat generated by the breakdown of sewage and organic matter into fertilizer to augment the system;

-use of impurities extracted from the air for use in sewage converter;
-use of heat from roadways and other heat absorbing surfaces, especially those surfaces that tend to trap and contain the heat of the sun, to augment the functioning of the Bio Tower;
-use of heat from tunnels especially underground railway tunnels, motor vehicle tunnels and other heat absorbing or generating sources, to augment the functioning of the Bio Tower.
The Bio Tower may incorporate all methods simultaneously in such a way that they augment each other.
Also preferably, when the system is used in conjunction with a landscaped (flora covered) interior portion of the tower, which is preferably configured in a spiral formation, air may be drawn into the tower by the cooling process associated with the extraction of the heat from the water gathered from the air conditioning systems (and other heat generating sources) from surrounding buildings, tunnels, road surfaces etc. and, in so doing, the air may be oxygenated and purified and the impurities captured by the process of cooling the said water may be fed into the landscape and thus filtered. This same process may be cycled two or more times to cool the water to the desired temperature and to augment the downward flow of air. If the system is so configured so as to create low air pressure at the base of the Bio Tower for use in drawing air down the tower, the aforementioned system, utilizing air temperature differential to cause a downward flow of air down the landscape, may thus be augmented or substituted.

Each of these above systems preferably may be used together in such a manner so as to augment the functioning of entire system in total. They may also be used as separate systems or in any combination.

The Heat Chimney
One system (the heat chimney) utilises the heat exhausted from air conditioning systems, gathered from heat absorbing surfaces, tunnels and other heat sources and uses it to create an updraft of air in the tower, which may be harnessed with the use of electricity-generating turbines either within the tower or within or connected to the air intake of the tower supplying the updraft of air within the tower, and/or to the output of the same tower. This system may be used as a separate system. As well as generating electricity it may also be used to exhaust dirty or used air from urban areas in close proximity to buildings with mechanical air conditioning systems or other heat sources. Also preferably the tower may be incorporated with other functions. For example it may also be use as a look out tower with restaurants and other recreational or tourist facilities.
Also the system may preferably be incorporated into the design of an office tower or other building form, the chimney being used in the core of the building and preferably in conjunction with the lift shaft.
Also the system may preferably be incorporated into the design of an office tower other building form, the chimney being connected to the exterior of the same building and preferably clad in glass so maximize heat gain from the sun.
Preferably this system will be used help to prevent the build up of heat around major cities (commonly known as the heat island effect) by extracting heat

from buildings and other heat sources and releasing the same heat in the said heat chimney and venting it in the upper atmosphere above the city and preferably generate electricity for the city in the same process. The electricity may preferably be connected to the existing electrical power system (commonly known as the power grid).
The Heat Chimney may extend from under the ground to well above the ground. The higher the chimney the more effective it becomes. The chimney may be entirely built under ground if required or may extend from the top of a structure and reach higher.

Heat trap

The second system (the heat trap system) relies on the heat of the sun to generate hot air within the tower. It collects the sun's heat by trapping the heat of the suns rays within an air cavity between two layers of glass. The external layer of glass allows the heat from the suns rays to pass through it from the outside to the inside, however it prevents the majority of the same heat from passing back through the same glass from the inside to the outside atmosphere. Once the heat from suns rays pass through the air cavity, the majority of it is prevented from passing through the second layer of glass which reflects the same heat radiation and thus retains the heat within the same air cavity, effectively trapping the heat.
Preferably this same heat trap may be incorporated into the outer façade of the said Bio Tower, which preferably is configured to incorporate the spiral cavity aspect of this invention and the same heat trap system may also be incorporated into a glass roof structure at the base of the said tower and connected to it in such a way that the heat may flow from the heat trap cavity in the glass roof into the heat trap cavity in the façade of the tower (which may also function as a spiral cavity and thereby augment the system.
Preferably this same heat trap may be incorporated into the outer façade of a preferably tall building and the same heat trap system may also be incorporated into a glass roof structure at the base of the same tower and connected to it in such a way that the heat may flow from the heat trap cavity in the glass roof into the heat trap cavity in the façade of the tower and thereby augment the system. This form of the invention relies on the heat trap cavity around the perimeter of the building to act in a similar way as the said "heat chimney" in that it forms the stack containing the updraft of warm air. It has the additional benefit of allowing light into the building whilst filtering out most of the radiant heat from the sun. This aspect of the invention can be added to existing buildings or incorporated into the design of new buildings and it can be used to augment the ventilation of the building to which it is incorporated with as the updraft within the façade cavity may be accessed from the interior spaces of the same building with vents that promote the functioning of the so called Venturi effect which may be used to draw air from the building into the updraft in the cavity. If the suction created by this aspect of the invention was used to draw air into the heat trap façade through habitable areas via a cooling area such as a landscaped space or a space filled with air born water such as a waterfall or a fine mist spray, or other cooling and preferably purifying system the said invention also be used to regulate the air temperature in a building in such a way as to minimize the need for mechanical air conditioning. As the invention may be used to prevent

most of the suns radiant heat from entering a building the need for air conditioning to remove the same heat is greatly alleviated. The energy saved by this aspect of the invention can thus be largely conserved for the generation of electricity and a higher proportion of external air may preferably be allowed into habitable parts of the building when the external air temperature is appropriate creating a healthier internal environment.

Preferably this same heat trap may also it may be incorporated into a glass roof structure at the base of the said heat chimney aspect of this invention. The glass roof would be ideal for providing shelter over a large public square as it would allow the sun's light to illuminate the space whilst preventing excessive heat build up as well as making the space usable during times of wet or inclement weather. The heat trapped within the roof cavity would flow into and augment or completely supply the air rising in the chimney, which would preferably be made of glass, which allows the majority of the sun's radiant heat into the chimney but not out and thus increasing the heat absorbing capacity of the system. Preferably the heat from all available heat sources (such as air conditioning systems, road surface heat, underground tunnel heat etc.) should be released into the same chimney. In this way heat from air conditioning systems, road surfaces and other sources of heat as well as heat directly captured by the invention from the sun is combined within the one chimney to create rising air. This rising air may preferably be utilised to drive generators to generate electricity and extract dirty and polluted air preferably from the street level of the city and from tunnels.

Heat trap glazing – Plasma Glazing

This invention relates to the provision of devices for the transforming of electromagnetic radiation (specifically from the sun) to heat a liquid or gas within a cavity between two or more layers of glass or other preferably transparent or semi opaque material, which may then be transported to the said Bio-Tower and/or to other devices, which may extract the same heat and use it for useful purposes or store the liquid for later use.

In one aspect, the present invention relates to a method and apparatus for exposing microscopic organisms, such as algae, to solar radiation within a liquid such as water, which is preferably maintained at an appropriate temperature for the growth and reproduction of said microscopic organisms, which may preferably be used to augment the functioning of the said Bio Tower and/or other processes in related and connected systems, in regard to, for example, the decomposition of organic matter and the production of methane gas.

In another aspect, the present invention relates to a method and apparatus for regulating the amount and type of solar radiation that enters a building or other structure.

In another aspect, the present invention relates to a method and apparatus for creating or augmenting the movement of fluid or gas within one or more cavities encased by glass or other preferably transparent or semi opaque material, using thermal syphoning, and/or capillary action and/or mechanical

pumping, which may preferably be used to transport the same liquid or gas to the said Bio Tower and /or to other connected systems, in order to make use of the energy and/or the organic matter contained within the said liquid or gas.

In another form of the invention and applicable to all of the forms of the invention, the said Plasma Glazing may also be formed with one or more air passages that utilizes the thermal energy that is not collected by the said fluid or gas within the said cavity in order to create movement of air in a building or the like, preferably to distribute heat within an architectural space when the external temperature is below a comfortable range and preferably the same air passage may be used to ventilate air within an architectural space when appropriate. In this way the sun's energy may be utilized in various ways; that is a proportion of its radiant energy is filtered and converted into heat in the fluid cavity for use in the Bio Tower and/or other useful purposes and the convection heat that is not captured by the same fluid may be used to create air movement within a structure, whilst the remaining solar radiation is used to illuminate the interior of the same structure whilst also preferably providing a view out of the same structure.

In another form of the invention and applicable to all of the forms of the invention, the said Plasma Glazing may also form a solar radiation collector that comprises a method and apparatus for hydrogen production utilizing either natural photosynthetic organisms or biomimetic/artificial photosynthetic systems and the said hydrogen produced would preferably be utilized in the said Bio Tower to augment its functioning, preferably by augmenting the updraft within the said chimney by burning the same hydrogen gas and/or by utilising the same hydrogen gas to power fuel cells to generate electricity and heat; the same electricity produced would augment the production of electricity from the turbines of the same Bio Tower and the said heat from the said fuel cells would be directed into the chimney of the tower to augment its updraft.

Spiral cavity

The third method of generating an updraft within the tower is to form a spiral formation in the façade of the tower in such a way as to gather the wind flowing around the tower and direct it into a spiral cavity following the shape of the spirally formed façade, and thus forcing the wind up the spiral cavity drawing air behind in from within the cavity. The spiral façade preferably should allow air into its cavity and not out, in this way the air pressure caused by the wind entering the spiral cavity will force air up the spiral cavity as it can only escape from the top of the tower.

Preferably the tower will incorporate all three methods of creating an upward movement of air in such a way that they will augment each other. Preferably the spiral cavity will be divided into two sections; an upper and a lower section along its length. The upper section may be open to the external atmosphere

and would use flaps, valves or other devices, which may preferably be computer controlled and, in most instances, be used to allow wind to be drawn into the upper section and prevent the same wind from exiting the upper section unless the same wind is nearing the top of the tower. As the air flows up the tower, low air pressure would be created at the base of the tower drawing air through air intake device(s) and/or through a sun heated air cavity type "Heat Trap" in a glass roof at the base of the tower.
The lower section of the said cavity would preferably be divided from the upper section with the use of flaps, valves or other devices, which preferably may be computer controlled and, in most instances, be used to allow air to be sucked into the upper section from the lower section and prevent the same wind from returning into the lower section. The lower section is preferably to be connected to the air intake of the tower, which would preferably be at its base and therefore may form the means to supply air to the upper section along its entire length via the said flaps, valves or other devices.
The air from the lower section of the said cavity may be drawn into the upper section of the said cavity by one or both of two means. In the first means air would be drawn into the upper section when the air pressure in the said upper section is lower than the air pressure in the said lower section, thus causing air to flow from the lower to the upper section of the spiral cavity in order to equalise the air pressure. The differential in air pressure between the upper and the lower section would be caused by the movement of air up the spiral cavity creating lower air pressure in the upper section the closer it is to the base of the tower. Also, wind may preferably be prevented from entering the upper section of the same cavity in the area close to the base and this should preferably be regulated by computer or (other means) in such a way as to maximise the updraft and sucking power caused by the wind within the spiral cavity.
The centrifugal force acting on air may also cause a differential in air pressure as it moves upward in a spiral formation causing greater air pressure at the outer perimeter of the upper section of the spiral cavity. Preferably the valves, flaps or other devices that divide the upper section from the lower section should be used to allow air to flow from the lower section into the upper section where the air pressure differential is at its greatest (i.e. where it is closest to the inner core).
The second means by which the air may be drawn from the lower section into the upper section of the spiral tower is by a method that makes use of the 'Venturi effect', in which the flow of air past a opening draws air into the same opening and into the slipstream of the air. The flaps, valves or other devices that separate the upper section from the lower section may preferably also be used to draw air from the lower section into the upper section of the spiral cavity by maximising the said 'Venturi effect'. This effect, set up when air flowing in the upper section passes over the openings that separate it from the lower section, should preferably be regulated by computer controls or by other means in order to achieve maximum updraft when required.

The wind-inducted movement of air up the spiral cavity of the tower would naturally be dependant on the velocity of the surrounding wind and therefore be sporadic. The same upward air movement within the tower would also be

augmented by the upward movement of hot air (hot air being air that is hotter than the outside atmosphere).
The heat chimney method of generating hot air together with the heat trap method will cause air to flow up the spiral cavity of the tower regardless of the wind velocity. This system may also preferably incorporate a vertical shaft that connects the upper spiral cavity at the base of the tower to the lower spiral cavity near the top of the tower providing two ways for the air to flow and depending on a combination of all the conditions, will flow in the direction of the lowest air pressure. As valves, flaps or other devices will preferably be positioned between the vertical shaft and the upper spiral cavity along its length the system may further be augmented by a flow of air between the vertical shaft and the upper spiral cavity when appropriate. When the pressure differential between the upper spiral cavity and the vertical shaft is big enough it will cause air to be sucked into the upper spiral cavity from the vertical shaft and thus increase the velocity of the air movement up the vertical shaft. Preferably this vertical shaft should be positioned close to the core and preferably surround the core in this way the centrifugal forces acting on the air flowing up the spiral cavity may be harnessed to induce increase updraft in the vertical shaft.

Also preferably the system may be used with a plants and vegetation (an interior landscape) established in the core of the building and so configured so as to purify and oxygenate the incoming air and preferably further direct the air to provide a healthy atmosphere for people close by (for example in a large public space or park that may be covered with the said glass roof structure). This interior landscape may preferably be configured in a spiral formation with air, entering from the upper reaches of the tower and flowing down the landscaped spiral, being cooled by the landscape as it flows – the cooling effect promoting the downward flow. Preferably, the cooling effect may be augmented by using the spiral tower to cool water piped from the air conditioning units from surrounding buildings (especially office towers). The by-product of extracting the heat from the water of air conditioning systems is cooled water. As previously mentioned the water would be used in the outer cavities of the tower to promote updraft and the cooled water, in the form of a fine mist spray, would irrigate the landscape. After filtering through the landscape the same water would be piped back into the air conditioning systems from where they originated and thus completing the cycle.

Preferably, the inner spiral is a stepped landscape, which purifies air entering from above. Flora may be incorporated preferably into a spiral configuration. The evaporative effect caused by the plants and their irrigation system, cools the air and causes it to flow down the spiral like a river drawing air from above. Plants detoxify and oxygenate the air, which is delivered into public spaces, habitable areas and the like, and preferably pushing used air up and out. The water directed from the cooling towers of surrounding air conditioning plants may preferably be used to help irrigate the plants by creating a fine mist spray over the pants in the central spiral. The heat released through this method rises and may be directed via computer regulated passages into the outer cavity of the structure, which is itself formed into a double spiral and with the appropriate glazing will become a heat trap causing the upward

movement of hot air and regulating the heat gain in the inner spiral. The shape of the façade of the structure, with the use of computer regulated flaps, may preferably be used as a wind scoop - capturing the winds and forcing the air to spiral upwards within the tower. An adjacent and lower spiral cavity forms the air intake of the system. The vacuum created by the upward movement of air in combination with a computer regulated "Venturi effect" acting along the entire length of the double outer spiral cavity creates an enormous air pump augmented by the heat released from surrounding buildings via their air conditioning systems within the inner spiral. The suns heat trapped in the outer spiral cavity also may be used to augments the system.

Depending on its size, this system may go a long way towards alleviating the "heat island effect" which threatens most major cities. On still days when there is little breeze to blow away the hot air, the tower, by delivering a large amount of heat high above the city to a single point, will conceivably create a bubble of hot air that will push upward and in effect pierce the bubble of warm air surrounding the city and induce an upward movement thus "draining" the air into the upper atmosphere.

The inner spiral is a stepped landscape, which purifies air entering from above. The evaporative effect caused by the plants and their irrigation system, cools the air and causes it to flow down the spiral like a river drawing air from above. The water directed from the cooling towers of surrounding air conditioning plants may be used to help irrigate the plants by creating a fine mist spray over the pants in the central spiral. The heat released through this method rises and may be directed via computer regulated passages into the outer cavity of the structure, which is itself formed into a double spiral and with the appropriate glazing will become a heat trap causing the upward movement of hot air and regulating the heat gain in the inner spiral. The shape of the façade of the structure resembles an unfolding leaf which, with the use of computer regulated flaps, becomes a giant wind scoop - capturing the winds and forcing the air to spiral upwards. An adjacent and lower spiral cavity forms the air intake of the system. The vacuum created by the upward movement of air in combination with a computer regulated "venturi effect" acting along the entire length of the double outer spiral cavity creates an enormous air pump augmented by the heat released by the landscaped inner spiral and the suns heat trapped in the outer spiral cavity.

<u>Methane from Sewage and other Organic Waste</u>

As so called waste products are a valuable resource the current invention offers a means by which to harness sewage, paper and other organic waste by combining it with the heat waste of air conditioning systems and, if necessary, the heat from other sources in order to produce electrical energy, gas and fertilizer.

This is made possible due to the fact that sewage and much organic waste, produce bio gas (consisting mostly of methane gas) when undergoing decomposition under suitable conditions. For this process to occur in a quick and expedient manner it is preferable that the sewage and other organic

waste be kept at a temperature of approximately 35 degrees Centigrade in sealed containers.
The water discharged from mechanical air conditioning systems commonly used in office towers and the like is normally at a temperature of 35 degrees Centigrade before it is cooled, which is an appropriate temperature for use in promoting the decomposition of sewage and other organic waste. Preferably the said sewage should be contained in gas extraction mechanisms and kept at the appropriate temperature preferably with the use of heat transferred from the said air conditioning systems and/or other sources of heat and transferred to the same sewage and other organic waste with the use of appropriate heat exchange systems and the process of gas extraction thus facilitated. Once the sewage and other organic waste commences decomposition the heat exchange systems are only needed to maintain the most appropriate temperature and if the process of decomposition causes an increase in temperature that is too high for the most efficient functioning of the system as a whole, the excess heat may be extracted preferably by the same heat exchange system and used to augment the functioning of the Bio Tower.
The gas should preferably be extracted from the same sewage and other organic waste and should preferably be stored in pressurised tanks for later use.
After the methane and other gases have been extracted from the sewage and other organic waste the material should preferably be transferred to another containment area and the heat suitably extracted (preferably during its normal cooling process) for use in augmenting the functioning of the Bio Tower.

The sewage (post methane extraction) in the said containment area should preferably be converted to fertilizer with the use of suitable worms, suitable microorganisms and suitable bacteria and generally kept in the right conditions to promote conversion to fertilizer. Preferably the same containment area should be of an appropriate depth and size to allow the build up of heat during the conversion process, the excess of which should preferably, if feasible, be extracted with an appropriate heat exchange system and used to augment the functioning of the Bio Tower.

Direct Fuel Cell

Preferably this invention may be further augmented by the use of so called "direct fuel cell" technology, which has the capacity of converting gas such as methane into heat and electricity without the use of combustion. It does this with the use of a chemical process. As part of the process the said methane is converted into hydrogen, which becomes the fuel for the said direct fuel cell. As heat is a by-product of this process and the same heat may preferably, be used by the Bio Tower to augment the system. The electricity produced will preferably be used to augment the electrical out put of the turbine driven generators incorporated in the Bio Tower and/or be connected to the electrical power grid or system of the region in which the tower is build.

In general the transfer of excess heat from the various processes that are carried out as part of the Bio Tower system may preferably be achieved with

The vehicles travelling upon the same road may preferably be used to generate the energy required to circulate the water from the said road surfaces to the Bio Tower. One possible method for achieving this aim is to use pressure operated mechanisms built into the road surface, which has the capacity to pump water. This may be achieved with the use of one-way valves or the like that allow water to pass in one direction and not the other. If water is squeezed out of the mechanism when a car drives over it, the water may travel in one direction and when the same pressure is released, new water may enter the mechanism ready to be pumped by the weight of another vehicle. Preferably the pumping device would be computer controlled to maximize the efficiency of the entire system, as is the case for all the various aspects and operable parts of the invention.

An appropriate version of the Bio Tower may be powered primarily from the heat gathered road surfaces and used anywhere in practical proximity to road surfaces for the generation of electricity and/or for the ventilation of tunnels, for example.

Heat may also be gathered from tunnels and discharged into the Bio Tower. A similar heat exchange system as described for used with road surfaces may also be used which transfers the heat gathered with the use of water. As the heat of tunnels may also be vented directly into the Bio Tower, the same heat exchange system may be used to cool air in the tunnel that is required to travel within a downward sloping tunnel in order to vented into the chimney of the Bio Tower. The Bio Tower may therefore use more than one method of extracting heat from a heat source and preferably the two methods will complement each other.

Water pipes cast in concrete also may form another form of heat exchange, which may be especially suitable for removing heat from surfaces in urban environments that are warmed by the sun. Preferably the water pipes would be so configured so as to allow the circulation of the water between the Bio Tower and the source of the heat in such a way as to maximize this heat exchange.

Any feasible means may be used to transfer heat from an appropriate energy source to the Bio Tower, especially if that energy source was problematic as is the case with heat exhausted from air conditioning systems.

Another energy source that may preferably be drawn upon is so called "Plasma Glazing" (as named by the author of this present invention).

Microwave technology may also prove a good way to transfer energy into the Bio Tower for example. Energy may be beamed to the tower from any practical place including from satellites which may convert the sun's radiant energy into microwaves that may preferably be beamed to the top of the Bio Tower which should preferably be as high as possible to avoid as many birds as possible. Extraneous electromagnetic radiation may be gathered and send to the Bio Tower via microwave technology.

All of the above configurations and systems or any combination of the above systems may be integrated with subways and/or road tunnel systems in order to ventilate them and used the heat exhausted from them to augment the above mentioned systems. In this way the heat generated from motor vehicles, trains and other equipment as well as people may be used to preferably generate electricity and preferably promote the entry of clean air into urban and other environments.

Diagrams

The following diagrams show examples of a schematic layout of the present invention. It should be realised that the forms of the invention described and illustrated are non-limiting.

The claims defining the invention are as follows:

1. An power plant utilising at lease one preferably tall vertical tower type structure (referred to as a Bio Tower or tower in this document) within which a current of rising air is used to drive one or more electricity generating turbines and the said air within the chimney is induced to rise by being heated by: the waste heat of air conditioning systems from nearby structures; the heat trapped in fluid carrier mediums such as water circulated in glazing systems (referred to a plasma glazing in this document) and glass street awnings and the like; the heat absorbed by hard surfaces such as road ways; the heat trapped by glass roofs and any other useful heat sources and transferred to the said chimney by appropriate heat transfer mechanisms which may preferably incorporate piped hot water (or other heat absorbing medium) to transfer the said heat and release it into the same chimney preferably with the use of the evaporative method. Preferably a venturi may also be incorporated with the said turbine(s) if it improves its functionality. The current invention may preferably be used to exhaust polluted used air from places such as city centres.
2. A power plant utilising a wind powered air pump (referred to as a Bio Tower in this document) which utilises passing wind to drive air upward within a tower configured in its internal and/or external shape in a helix type form and clad in such a way as to allow the passage of wind into the interior of the said tower so as to force the air in a motion spiralling upward within the cavity enveloped by the helix type structure and the said cladding encasing the said helix

type structure and thus creating a vacuum at lower regions of the tower and thereby draw in air at its base; the said movement of air may preferably be used to drive electricity generating turbines at the air intake of the said tower or within the same tower and wind paddles may also be used to take advantage of he concentric motion of the said spiral up draft; the said upward spiralling motion of the wind may preferably be created with the use of flaps, valves, scoops or other devices which allow the air into the structure where it is travelling in a similar direction to the said spiral updraft of air and thus augment or instigate its movement, whilst preventing the same wind from entering the same structure where the wind is travelling in a direction that is opposed to the said spiral updraft. The said flaps, valves, scoops or other devices would preferably be computer controlled in order to regulate the movement of air within the structure; however, they may also be controlled by wind sensitive mechanisms, or other appropriate devices or methods.

3. A wind powered power plant of claim 2 with a vertical stack positioned concentric to the central axis of a helix type form which incorporates flaps, valves and/or other devices to allow air to pass from the interior of the said stack into the cavity enclosed by the said helix type form and its cladding; this said passage of air should preferably occur when the air pressure surrounding the said stack is lower than the air pressure within the said stack, thus creating conditions that suck air out of the said stack and therefore draw air up the stack at a faster rate than would normally occur. Preferably a wind or air pressure driven electricity generating turbine may be incorporated within the said stack and/or at the air intake to the system and preferably paddles may also be incorporated to make use of the spiralling motion of the air to augment the generation of electricity.

4. A wind powered power plant which utilises passing wind to drive air both upward and downward within a tower formed of a double helix type form; its internal and/or external shape configured in said double helix type form in such a way as to allow the passage of wind into the interior of the said tower so as to force the air in a motion spiralling upward within first of two spiral cavities so formed, creating a vacuum at lower regions of the tower and thereby draw in air at its base;

the second of two spiral cavities also being formed in its internal and/or external shape configured within said double helix type form in such a way as to allow the passage of wind into the interior of the said tower so as to force the air in a motion spiralling downward within second of two spiral cavities so formed, creating a vacuum at upper regions of the tower and thereby draw in air preferably from its upper part;

the said movement of air may preferably be used to drive electricity generating turbines at the air intake of the said tower or within the shaft of the same tower;

the said upward movement of air may preferably be used to suck polluted air out of in city centres and prevent heat build up due to the exhaust heat from buildings in city centres; the downward air movement may preferably be used to provide ventilation and fresh air where needed and/or may be used to provide fresh air to underground tunnels and the like;

the said upward and downward spiralling motion of the wind may preferably be created with the use of flaps, valves, scoops or other devices which allow the air into the structure where it is travelling in a similar direction to the spiral draft of air and thus augment its movement, whilst preventing the same wind from entering the same structure where the wind is travelling in a direction that is opposed to the said spiral draft. The said flaps, valves, scoops or other devices would preferably be computer controlled in order to regulate the movement of air within the structure; however, they may also be controlled by wind sensitive mechanisms, or other appropriate devices or methods; the said movement of air may preferably be used to drive electricity generating turbines at the air intake of the said tower or within the same tower and wind paddles may also be used to take advantage of he concentric motion of the said spiral up draft. 4a. A wind powered electricity generator of claim 4 in which the said spiral cavity containing downward flowing air is also utilised as a spiral staircase and preferably connected to a multi storey building.

5. A wind and convection current driven power plant of claims 1 and 2 in which the spiral updraft of air created by the passing wind is used to augment the updraft of air generated by the heating of air within the tower. The same heated air would preferably be induced to move in and amongst the same spiral updraft created by the said wind and also preferably the same spiral motion of the wind would augment the motion of the said turbine if one or more said turbines are located within the shaft of the said chimney and/or in addition to the said turbines located at the said air intake of the same bio tower.

6. A wind and convection current driven power plant of claims 1 and 3 in which the spiral updraft of air created by the passing wind is used to augment the updraft of air generated by the heating of air in the tower in which the resultant heated air is allowed to rise in the said central vertical stack around which the said spiral updraft is centred; the said stack is preferably configured so as to allow the drawing of air into the perimeter cavity of the tower within which the spiral air movement is contained when this said drawing of air augments the total updraft of air in the said tower. This said drawing of air from the central stack may occur when the air pressure in the perimeter spiral cavity close to the central stack is lower than the air pressure within the same central stack due to the centrifugal force acting of the air spiralling within the said perimeter cavity resulting in a relatively high air pressure in the outer perimeter of the said cavity

and a low pressure close to the outer face of the said central shaft thus allowing for the inducement of air from the said shaft into the said perimeter cavity provided that suitable devices are incorporated to allow for and control this movement of air.

7. An air pump and/or power plant of claims 1 to 6 in which a transparent or semi opaque cladding is incorporated to enclose the said structure to allow solar radiation to pass into the interior of the said structure in order to further heat the air within the said structure and thereby augment the said updraft of air. Preferably the said transparent cladding would be glass and would preferably be coated or manufactured in such a way so as to allow the majority of the sun's radiation to pass through it and into the said interior and prevent as much as possible of the same solar radiation or infra red radiation from passing out from the said interior to the exterior. Preferably the said transparent cladding may consist of more than one layer and configured in such a way as to allow the passage solar radiation into the structure and prevent the passage of heat and electromagnetic radiation through the same cladding from the interior to the exterior and the said layers may preferably be configured with air cavities between the same layers to minimise heat loss through the exterior cladding of the said Bio Tower.

8. An air pump and/or power plant of any of the above claims formed into a tower in which a glass roof is incorporated at the base of the tower in order to trap the energy of the sun and transfer that same energy into the said Bio Tower. Preferably the said glass roof consists of more than one layer of glass with one or more air cavities between the said layers, the top layer(s) allowing the sun's radiation to pass through it but preventing most of the resultant heat and electromagnetic radiation from passing back out again; the lower layer(s) of glass reflecting the sun's radiation back into the said air cavity and thus trapping much of the sun's energy within the air cavity; preferably the same air cavity is so connected to the said tower to facilitate the movement of heated air within the said cavity to flow into the tower in such a way as to augment the said tower's functions, specifically the creation of upward air movement within the said tower. The said glass roof may also be clad with any suitable transparent or semi opaque material.

9. A solar radiation collector designed to expose a liquid carrier medium such as water as or a gas carrier medium to solar radiation within one or more cavities between or enveloped by two or more layers of glass or other preferably transparent or semi opaque material; the said liquid or gas is thus heated or otherwise transformed due to its exposure to said solar radiation and may then be circulated or transferred preferably to the said electricity generator of claims 1,3,5,6 and 7 or other devices via pipes or ducts or the like, which may extract the same heat and use it for useful purposes or store the liquid for later use; the said solar radiation

collector should preferably be useable as an architectural element such as a window pane or transparent roofing, thus allowing for the transmission of light into an architectural interior after it has completed its task of extracting appropriate energy from the solar radiation passing through it. The same solar radiation collector should also preferably collect heat and radiation reflected out of the same interior. The said solar collector therefore is preferably multi functional and may therefore be used as a fenestration member as well as a energy collector and preferably appear as a transparent glazing member, or as a patterned or textured or semi-opaque fenestration or cladding member within a building or other structure.

10. A solar radiation collector of claim 9 that comprises a method and apparatus for exposing microscopic organisms, such as algae, bacteria or plankton to solar radiation within said carrier medium (such as water), which is heated to an appropriate temperature for the growth and reproduction of said microscopic organisms, which may preferably may be used in other processes in related and connected systems, which for example may be the decomposition of organic matter and the production of methane gas, or the production of oxygen and hydrogen via a photosynthetic type chemical reaction within and outside of the said solar radiation collector. The said appropriate temperature may be regulated by the rate at which the said liquid or gas is circulated or pumped through the system.

11. A solar radiation collector of claim 9 that comprises a method and apparatus for regulating the amount and type of solar radiation that enters a building or other structure through the application of coating materials onto the glass or other preferably transparent or semi opaque members of the said solar radiation collector, which allows appropriate wavelengths of light through (such as those within the visible light spectrum) and absorbs heat and other energy that is not wanted to pass though into the inside and instead traps and transfers the same energy to the carrier medium (said liquid or gas).

12. A solar radiation collector of claim 9 that comprises a method and apparatus for creating or augmenting the movement of fluid or gas within one or more cavities encased by glass or other preferably transparent or semi opaque material, using thermal syphoning, and/or capillary action and/or mechanical pumping, which may preferably be used to circulate or transport the same liquid or gas to other connected systems in order to make use of the energy and/or the organic matter contained within the said liquid or gas.

13. A solar radiation collector of claim 9 that comprises one or more air passages and/or cavities that utilizes the thermal energy that is not collected by the said fluid or gas within the said cavity to heat the air in the said passage in order create the movement of air in a building

or the like preferably to distribute heat within an architectural space when the external temperature is below a comfortable range and preferably the same air passage may be used to ventilate air within an architectural space when appropriate with the use of vents flaps and the like. The same air heated in the said passage may also be distributed around an architectural space with the use mechanical systems such as fans and ducts and the like.

14. A solar radiation collector of claim 9 that comprises a method and apparatus for hydrogen production utilizing either natural photosynthetic organisms or biomimetic/artificial photosynthetic systems.

15. A solar radiation collector designed to expose a carrier medium such as water or a water based synthetic complex to solar radiation within one or more cavities between or enveloped by two or more layers of glass or other preferably transparent or semi opaque material, the said water preferably contains man-made compounds able to harvest solar energy and to use it to produce hydrogen from water through a process of artificial photosynthesis. This said artificial photosynthesis for hydrogen production from sunlight and water by direct photochemistry in synthetic complexes preferably should produce hydrogen (or other fuels) from solar energy and water. The heat trapped in the said water, due to its exposure to said solar radiation, may then be circulated or transported to other devices via pipes or ducts or the like that extract the same heat and use it for useful purposes or store the liquid for later use; the said solar radiation collector should preferably be useable as an architectural element such as a window pane or transparent roofing member, balustrade or the like thus allowing for the transmission of light into an architectural interior or space after it has completed its task of utilizing the appropriate energy from the solar radiation passing through it. The hydrogen or other useful substance produced via this said process of photosynthesis should preferably be captured by the said solar radiation collector and piped away for use or storage or may also be captured whilst the said carrier medium is being circulated or stored.

16. A solar radiation collector of claim 15 which exposes microorganisms such as bacteria to solar radiation within said carrier medium (such as water), which is heated to an appropriate temperature in order to promote the growth and reproduction of same microorganisms.

17. A solar radiation collector of claim 15 for the production of oxygen and hydrogen via a photosynthetic type chemical reaction whereby the appropriate temperature may be regulated by the rate at which the said carrier medium is circulated or pumped through the system.

18. A solar radiation collector designed to expose a carrier medium such as water or a water based synthetic complex to solar radiation within or below a pond or reflection pool, or architectural water feature; the said solar radiation collector is preferably positioned below a transparent separation medium such as a flat sheet of glass or other preferably transparent or semi opaque material, the said carrier medium below the said transparent separation medium preferably contains man-made compounds able to harvest solar energy and to use it to produce hydrogen from water through a process of artificial photosynthesis. This said artificial photosynthesis for hydrogen production from sunlight and water by direct photochemistry in synthetic complexes preferably should produce hydrogen (or other fuels) from solar energy and water. If the heat trapped in the said carrier medium is heated to an appropriate temperature, due to its exposure to said solar radiation, it may then be circulated or transported to the said bio tower or other devices via pipes or ducts or the like that transfer or extract the same heat and use it for useful purposes or store the liquid for later use; the said solar radiation collector should preferably be useable as an architectural element such as a water feature or transparent roofing member, or the like. The hydrogen or other useful substance produced via this said process of photosynthesis should preferably be captured by the said solar radiation collector and piped away for use or storage or may also be captured whilst the said carrier medium is being circulated or stored.

19. An power plant of any of claims 7 and 8 in which the solar radiation collectors of claims 9 to 18 are incorporated to augment the functioning of the system. Preferably solar radiation collectors of claim 14 may preferably by utilised in the outer layer of said transparent cladding of the said tower and the top layer of the said glass roof of said claim 8 so that the fuel such as hydrogen thus generated may be used to augment the functioning of the tower via the use of fuel cells or by combusting the same fuel so as to augment the functioning of the said bio tower.

20. A heat exchange awning system which may preferably be integrated with the said tower of claims 1,5 to 8 and which transfers the waste heat of air conditioning systems of nearby buildings through water pipes integrated with the same awnings to the said tower; preferably the said street awnings would have a glass roof to allow light to pass through to street level and preferably the glass awnings will use the sun's radiation to maintain or increase the water temperature in the said water pipes whilst they are circulating to the said tower; preferably the street awnings will be configured such that an air cavity separates two transparent glass roofing members which utilise the appropriate glazing types and coatings to create a said heat trap so that much of the sun's radiation is retained within the same cavity; preferably the heat thus retained may be used to heat water circulated within the same cavity and

preferably the same heated water may be circulated to the said tower to augment the functioning of the system via the release of the embodied heat thus gathered; preferably the same water circulating in the same cavity may be oxygenated due to the manner in which it is allowed to flow by air which is allowed to flow through the cavity and the same air may preferably be facilitated in its movement by being heated creating a convection current in the same cavity created by the same trapped heat and also by the slope and/or shape of the said cavity allowing for a generally upward flow of air; preferably the same convection current may be used to drive micro turbines preferably to generate electricity and preferably the same convection current will be augmented with the use of a chimney preferably connected to the highest part of the cavity and also preferably the said micro turbine would be connected to the same chimney; preferably a venturi may also be incorporated with the micro turbine if it improves its functionality. Preferably this same invention may be incorporated with the said plasma glazing of claims 9 – 17 that would preferably be used as the upper layer of the awning system provided that enough heat is allowed to pass through to the said cavity thus allowing the proper functioning of the same heat exchange awning system.

21. A power plant of claims 1,5 to 8 that may preferably be integrated with an underground circulatory system in which pipes are used to transfer the heat trapped by air conditioning systems of nearby buildings and preferably using hot water as a medium to contain the said heat for transferral via the same pipes to the said tower; preferably the said pipes would be positioned under hard surfaces such as roadways and foot paths which normally absorb heat from the sun; preferably the same pipes would be positioned so that the pipes carrying the water (or other heat transfer medium) would be heated by the sun's radiation when appropriate so as to maintain or augment the heat gain of the system.

22. An underground circulatory system which may preferably be integrated with the said tower of claims 1,5 to 8 in which the heat absorbed by hard surfaces such as road surfaces and the like may preferably collected by appropriate heat transfer mechanisms and circulated to the said tower with the use of pipes carrying water (or other heat absorbing mediums) and released in the tower in order to augment the updraft of air; preferably the said heat transfer mechanism may consist of a series of pipes positioned below the surface of the road way in which water (or other heat transfer medium) would be circulated before being circulated via larger pipes to the said tower; preferably heat from any appropriate heat absorbing surface may be transferred to the said tower by suitable heat transfer mechanisms; preferably the underground circulatory system of claim 21 may be installed and positioned in conjunction with this current aspect of the invention and preferably done so as to minimise heat loss by locating hot water pipes in the same

locality. Preferably any heat loss from the this present aspect of the invention may absorbed by the surrounding ground or mass so as to maintain the temperature of the water in the system when the original source of the heat is no longer providing heat. Preferably, when suitable, the said circulatory system may combine heat from different sources by running hot water (or other heat absorbing mediums) in the same pipes.

23. A power plant of claims 1,5 to 8 integrated with a heat transfer surface member that may form a new surface on an existing hard surface such as a roadway or a foot path in order to absorb the sun's radiation and transfer the heat thus gained to the said tower.

24. A power plant of any of the above claims in which sewage and other organic matter is collected and allowed to decompose in such a way as to capture the methane gas thus generated in the same process; the said gas preferably being utilised to augment the functioning of the said Bio Tower by preferably using the same methane gas to power direct fuel cells to generate electricity and heat; the same heat may preferably be utilised to augment the updraft of air within the chimney of the same Bio Tower and the electricity thus produced may preferably be utilised to augment or to compliment the electrical production of the electricity generating turbines of the said Bio Tower.
The said organic matter, which is non methane producing, may preferably be decomposed with the use of hydrogen-producing acetogenic bacteria and the hydrogen thus produced may preferably be used to power fuel cells for the production of electricity and heat preferably for the augmentation of the system. The said fuel cells may also be integrated with an electricity-producing turbine in order to make more efficient use of its heat by-product before the same heat is used to augment the functioning of the main turbine(s) of the said Bio Tower. A range of high pressure to low pressure turbines may be utilised in combination in order to increase efficiency of the said Bio Tower.

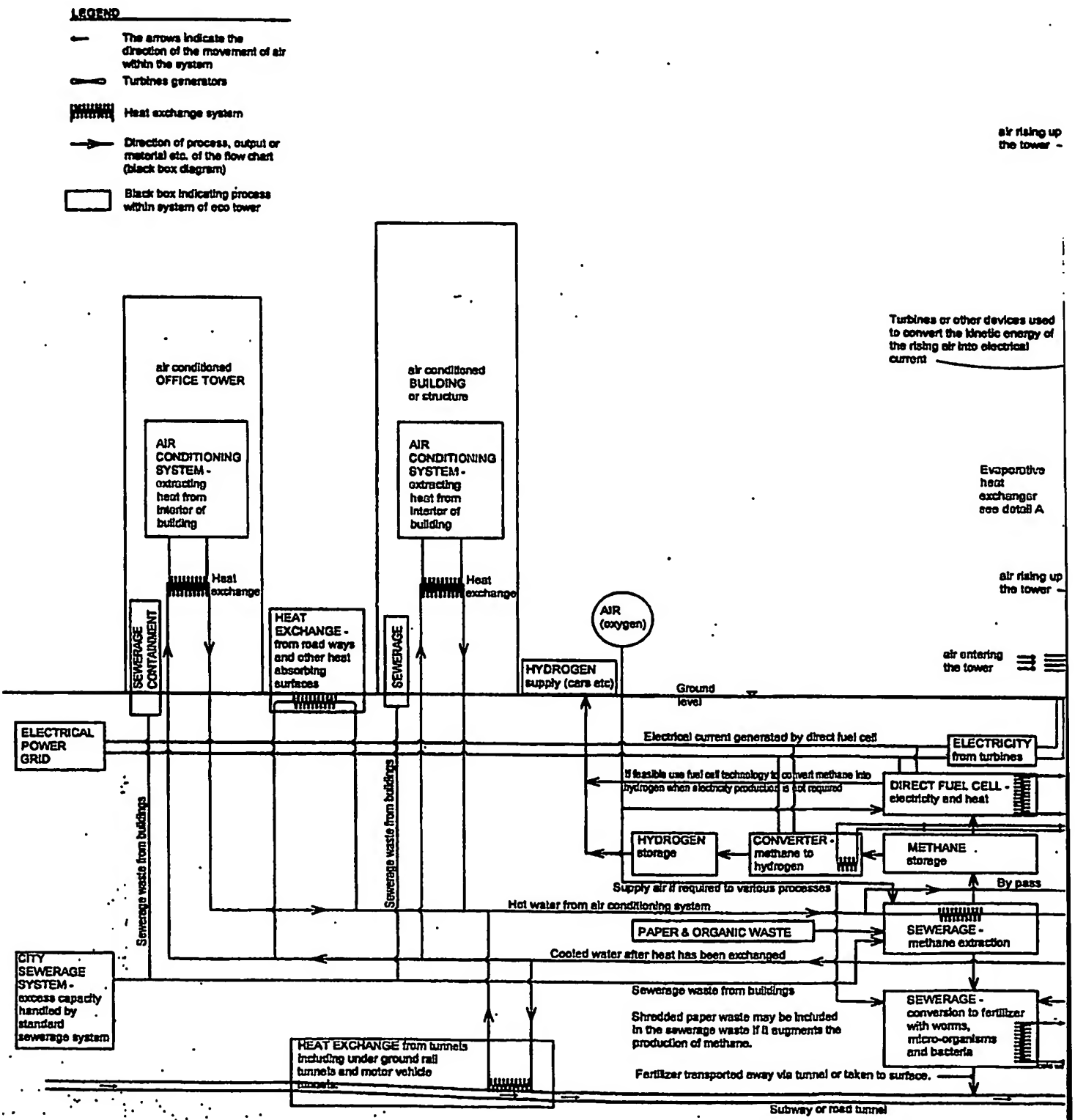
25. An power plant of any of the above claims in which sewage and other organic matter is collected and allowed to decompose in such a way as to capture the methane gas (and other gases) thus generated; the said gases preferably being utilised to augment the functioning of the said tower by preferably using the same gases to generate heat through the process of combustion; the said heat may preferably be utilised to augment the updraft of air within the chimney of the same tower.
The said organic matter, which is non methane producing, may preferably be decomposed with the use of hydrogen-producing acetogenic bacteria and the hydrogen thus produced may preferably be combusted for the production of heat preferably for the augmentation of the tower.

Preferably the heat needed to facilitate the decomposition of the said organic waste may be provided by the heat from the same air conditioning systems connected to the Bio Tower and all other appropriate heat sources including the waste heat from the said fuel cells and preferably the same heat may be released into the Bio Tower to augment the system. Preferably when methane is not needed to run the Bio Tower, it may be stored and/or used by motor vehicles or converted into hydrogen gas.

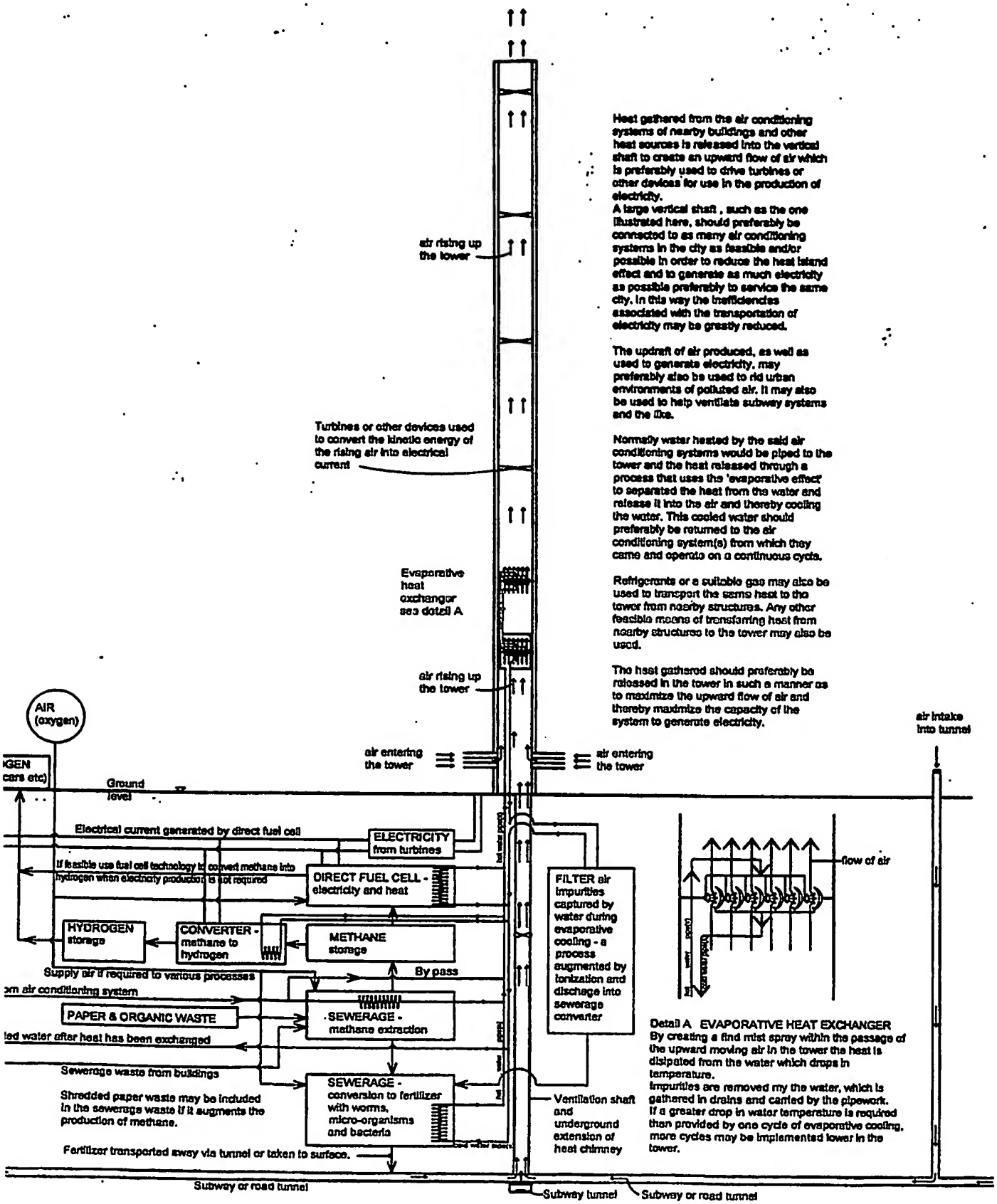
26. A power plant of any of the above claims in which the water vapour that condenses on the inside face of the chimney of the Bio Tower is collected and stored or piped away for useful purposes; preferably the said water may be stored within the chimney of the Bio Tower during the day in such a way as to store the embodied heat as well as gather the heat from the sun in order to release the same heat into the tower during the night and therefore help to extend the energy producing capacity of the system. Preferably the said water would be piped away for use elsewhere when it has cooled and the majority of the embodied heat released.
27. A power plant of claims 2 – 8 in which buildings in close proximity to the same Bio Tower are used to direct or other wise change the flow of wind in order to augment the functioning of the same Bio Tower.
28. A power plant, substantially as herein described with reference to the accompanying drawings.

29. An air pump substantially as herein described with reference to the accompanying drawings.

ECO TOWER
- HEAT CHIMNEY + BIO SYSTEMS

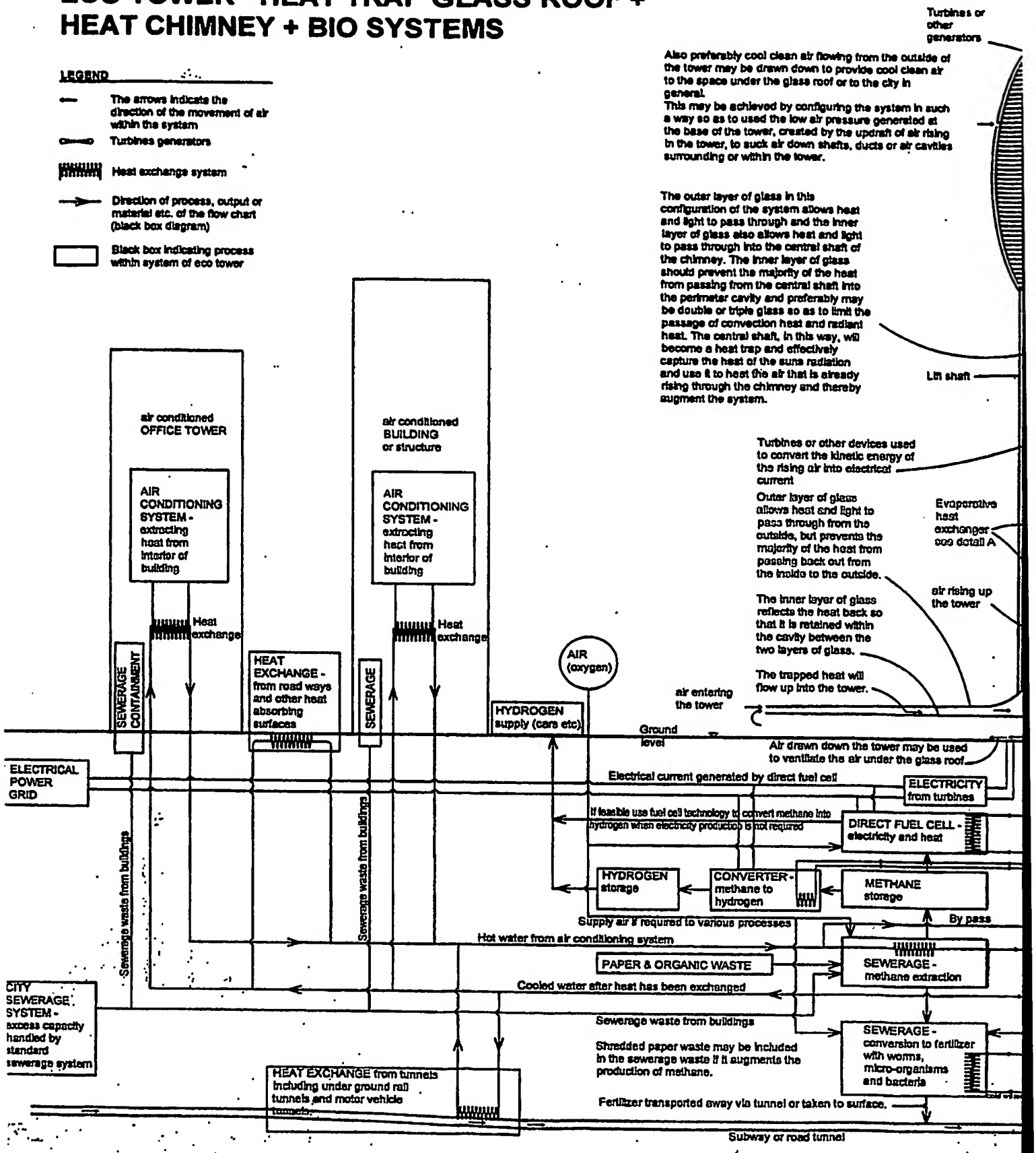


SCHEMATIC BLACK BOX LAYOUT OF BIO FUNCTION RELATED TO CONC



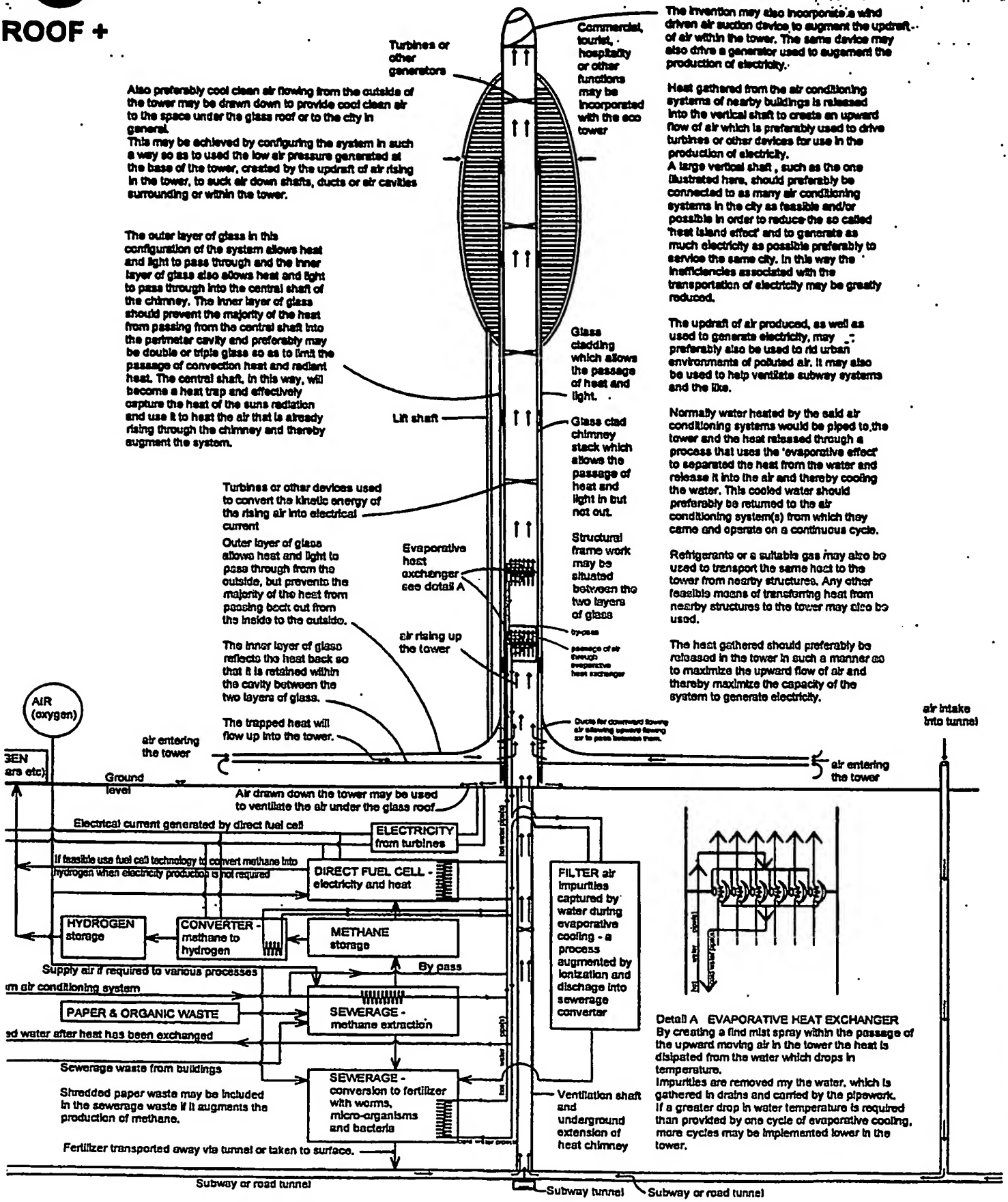
BIO FUNCTION RELATED TO CONCEPTUAL SECTION OF THE TOWER

ECO TOWER - HEAT TRAP GLASS ROOF + HEAT CHIMNEY + BIO SYSTEMS



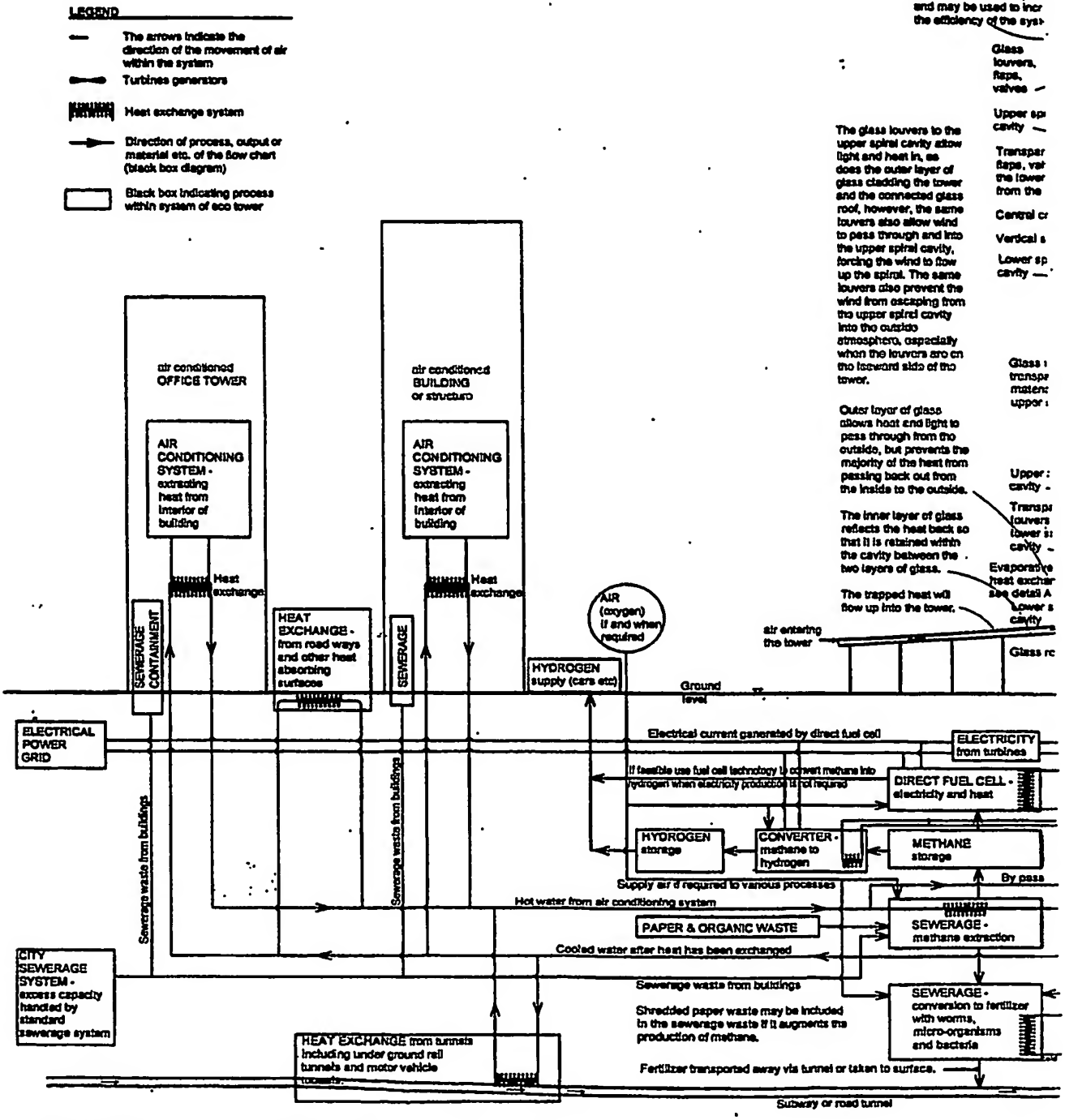
SCHEMATIC BLACK BOX LAYOUT OF BIO FUNCTION RELATED TO CONC

ROOF +



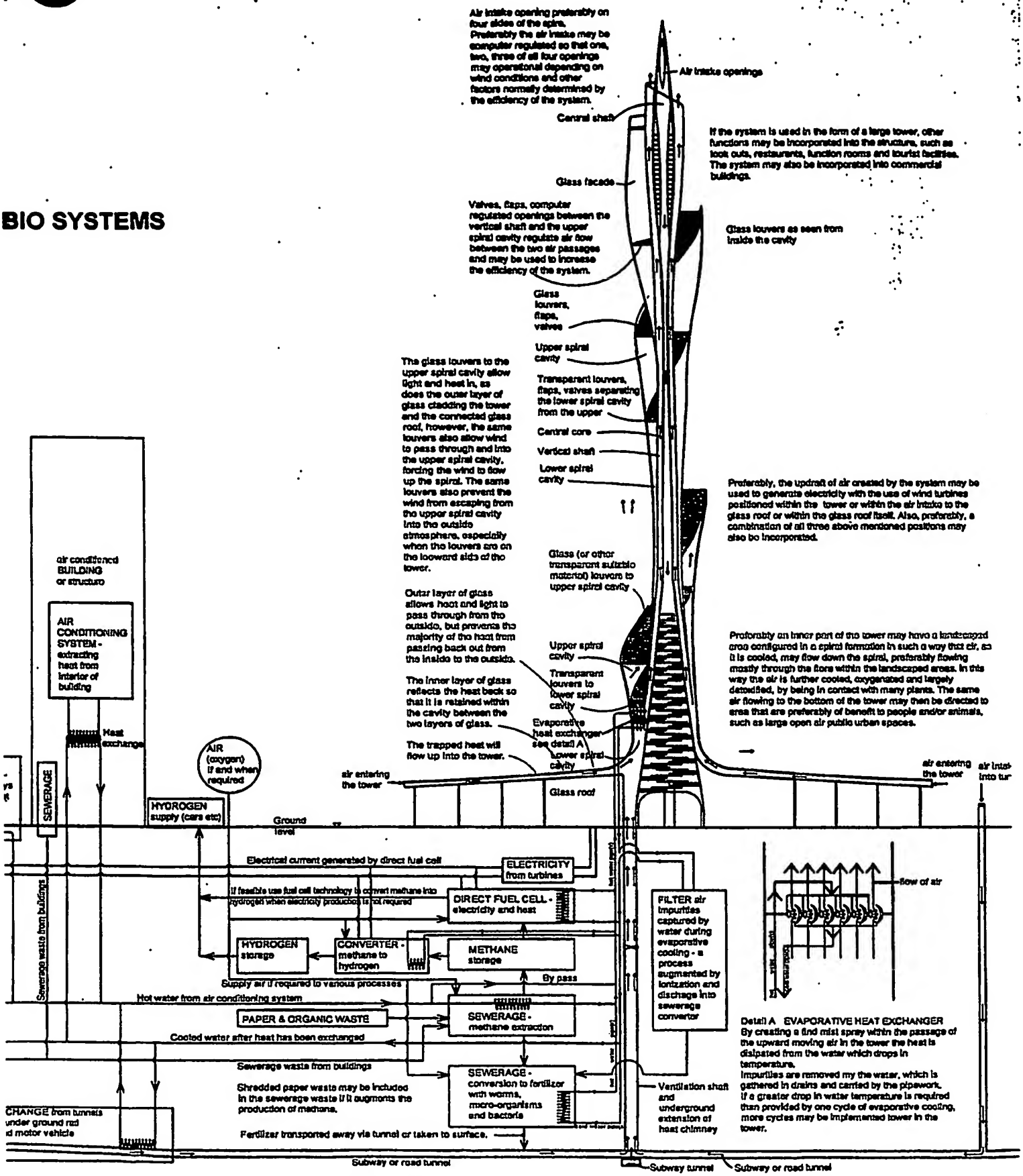
IO FUNCTION RELATED TO CONCEPTUAL SECTION OF THE TOWER

ECO TOWER
- HEAT CHIMNEY + BIO SYSTEMS



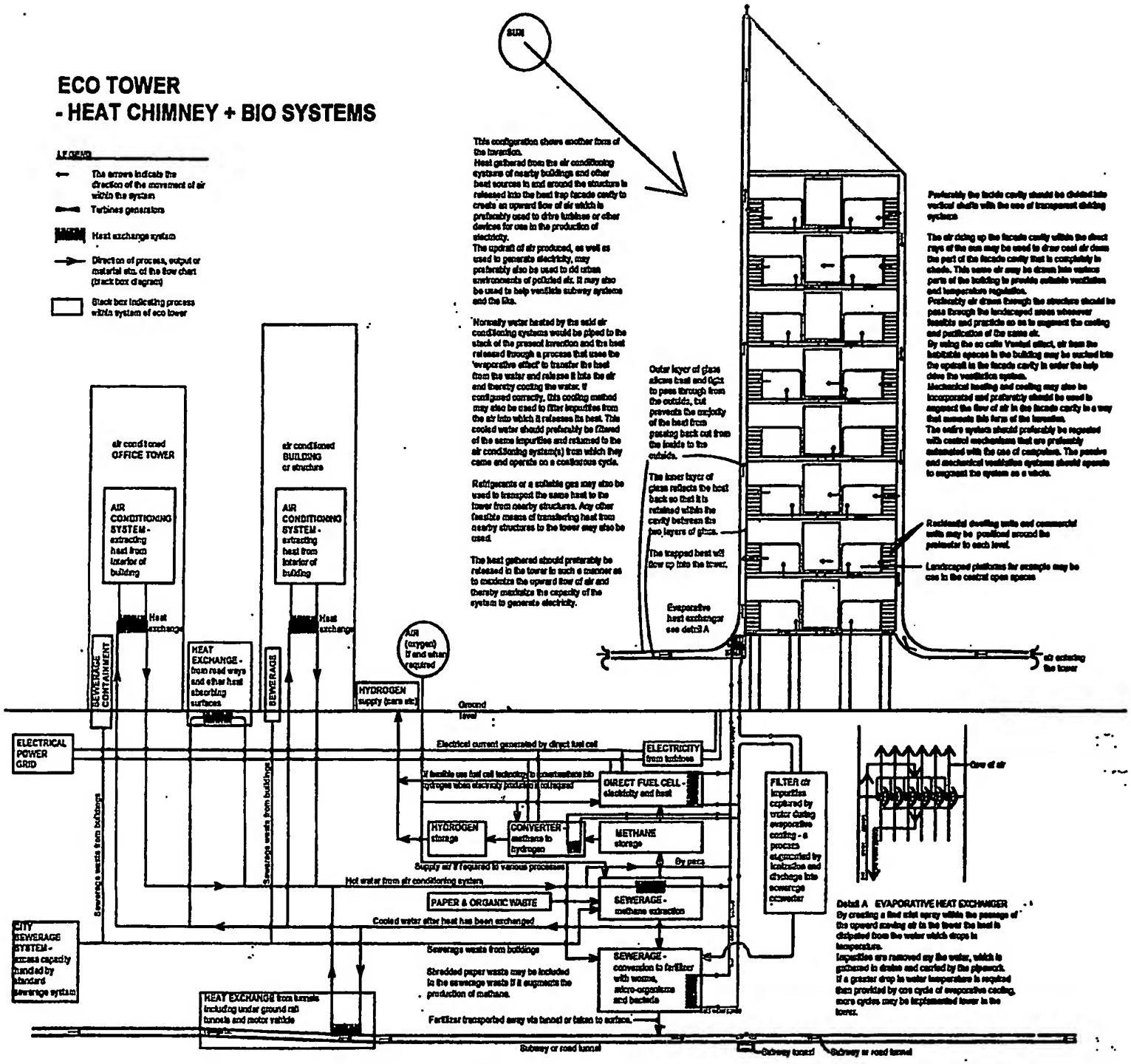
SCHEMATIC BLACK BOX LAYOUT OF BIO FUNCTION RELATED TO CON

BIO SYSTEMS



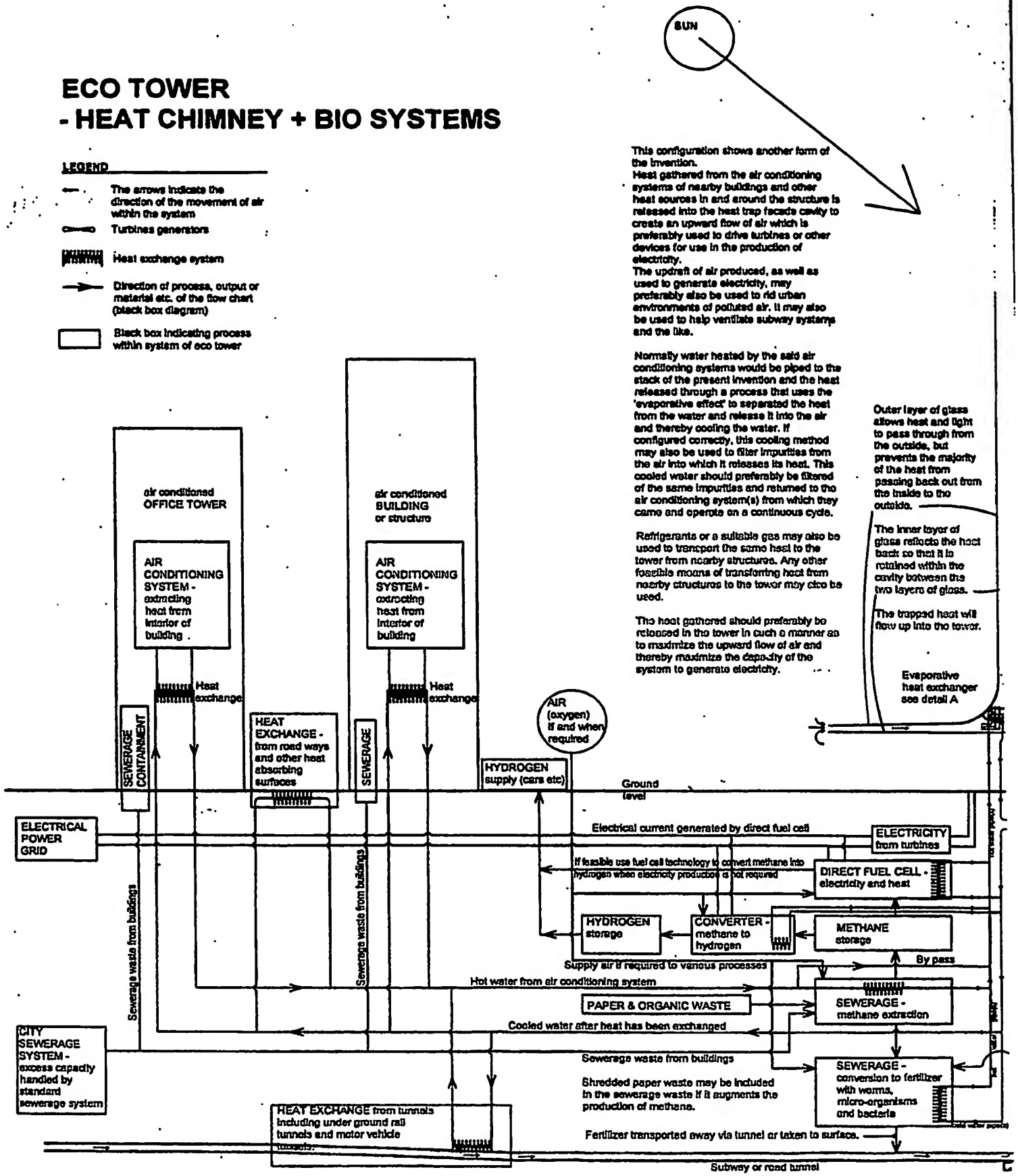
)X LAYOUT OF BIO FUNCTION RELATED TO CONCEPTUAL SECTION OF THE TOWER

ECO TOWER
- HEAT CHIMNEY + BIO SYSTEMS

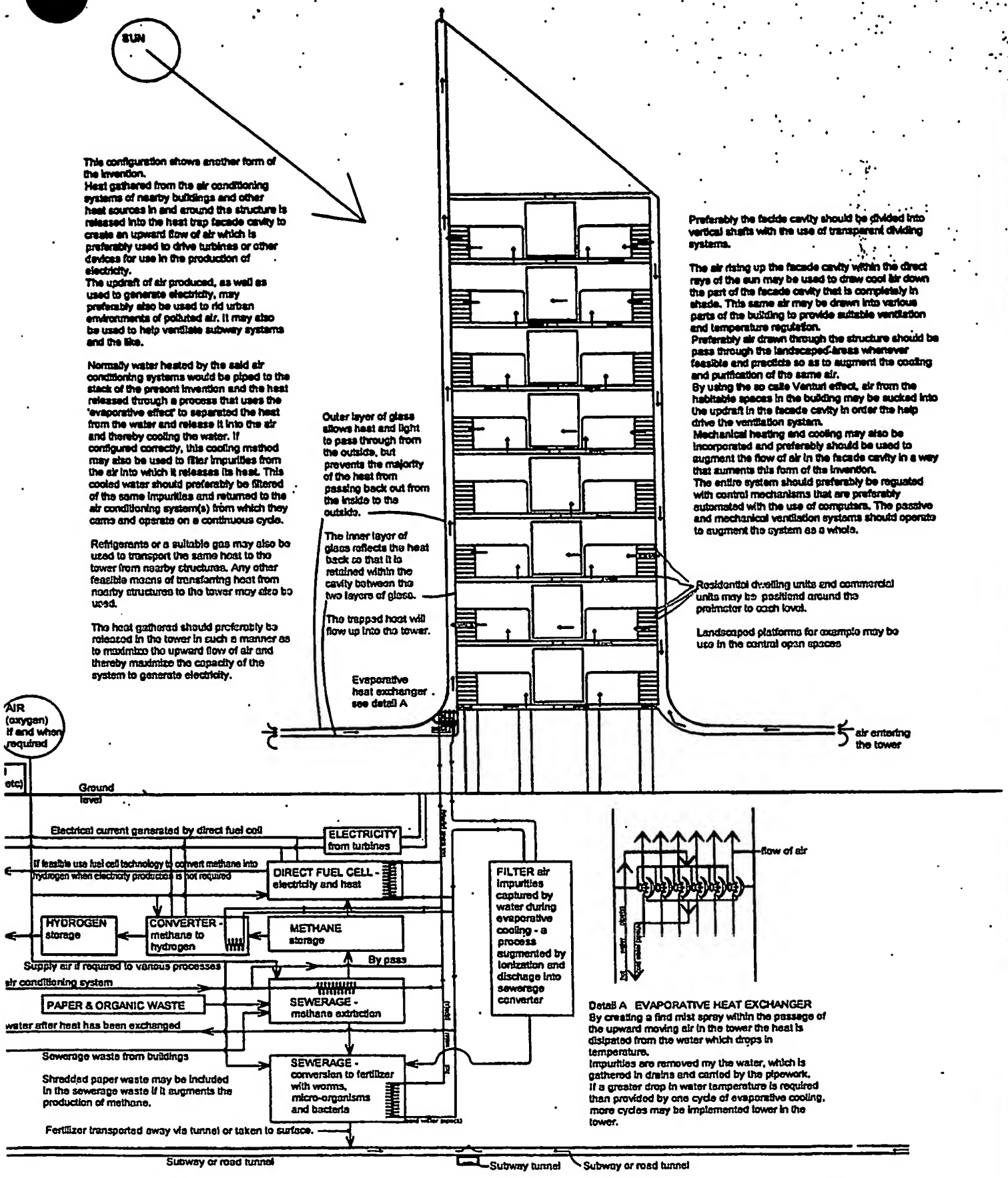


SCHEMATIC BLACK BOX LAYOUT OF BIO FUNCTION RELATED TO CONCEPTUAL SECTION OF THE TOWER

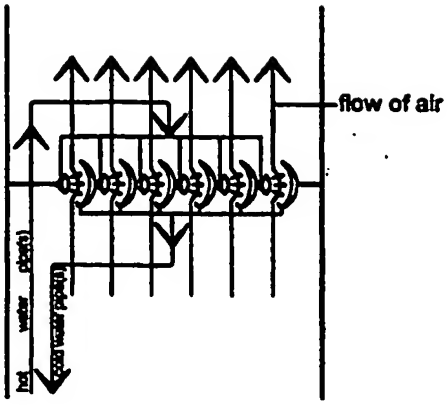
ECO TOWER
- HEAT CHIMNEY + BIO SYSTEMS



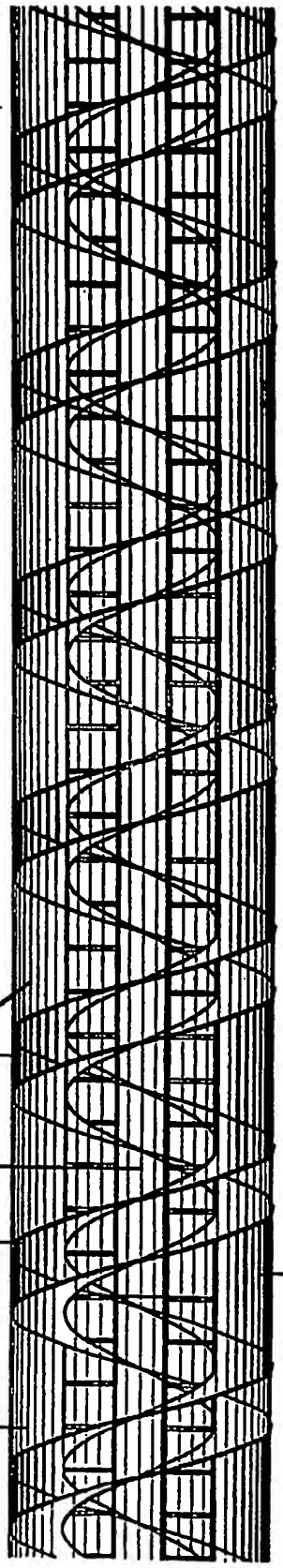
SCHEMATIC BLACK BOX LAYOUT OF BIO FUNCTION RELATED TO CONCEF



O FUNCTION RELATED TO CONCEPTUAL SECTION OF THE TOWER



Detail A EVAPORATIVE HEAT EXCHANGER
By creating a find mist spray within the passage of the upward moving air in the tower the heat is disipated from the water which drops in temperature.
Impurities are removed my the water, which is gathered in drains and carried by the pipework.
If a greater drop in water temperature is required than provided by one cycle of evaporative cooling, more cycles may be implemented lower in the tower.



Glass louvers, flaps, valves

Central shaft

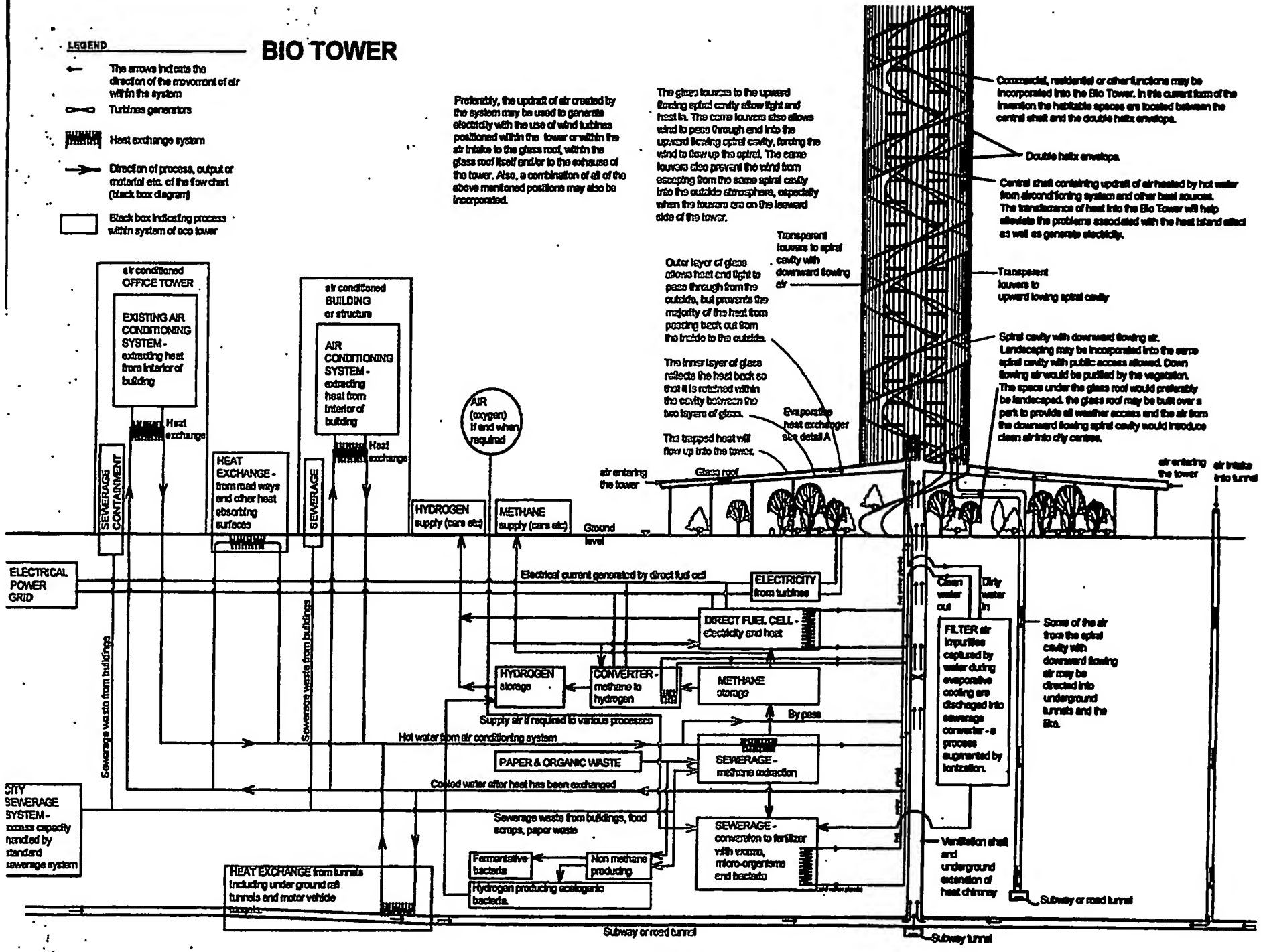
Glass facade

Glass louvers open to oncoming wind, forcing air into downward flowing spiral motion.

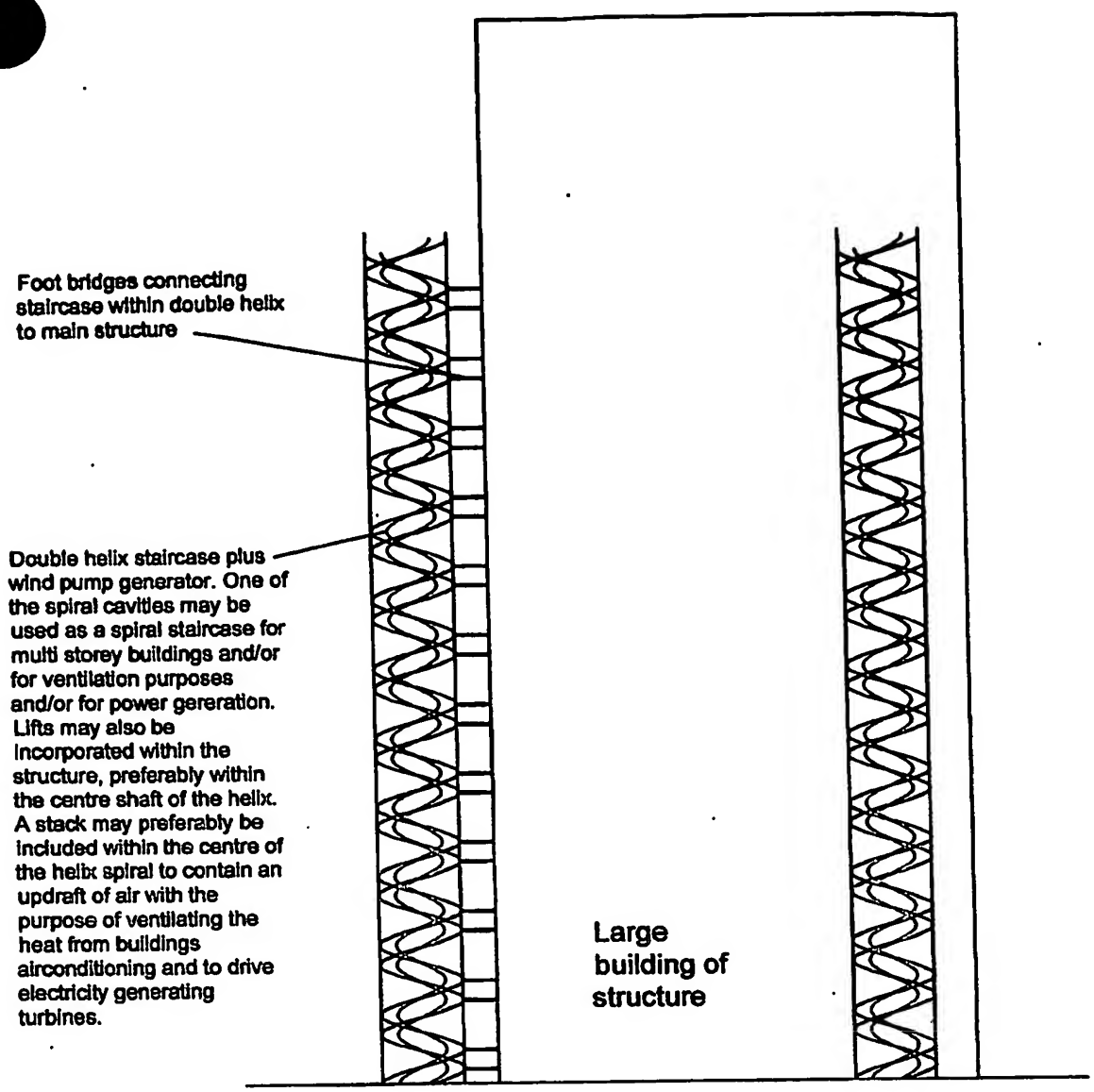
Glass louvers open to oncoming wind, forcing air into upward flowing spiral motion.

If the system is used in the form of a large tower, other functions may be incorporated into the structure, such as look outs, restaurants, function rooms and tourist facilities.
The system may also be incorporated into commercial buildings.

BIO TOWER

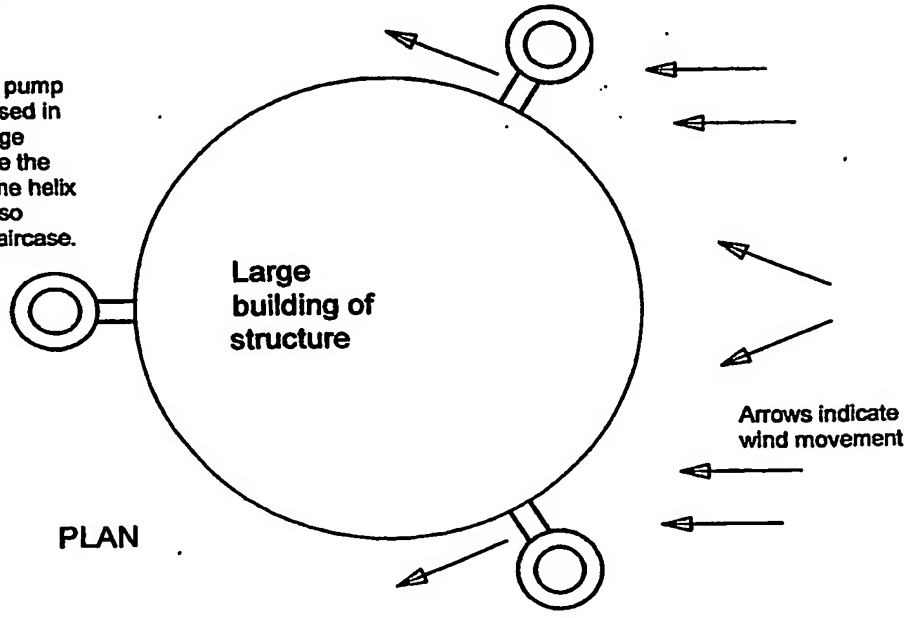


SCHEMATIC BLACK BOX LAYOUT OF DOUBLE HELIX BIO TOWER SYSTEM

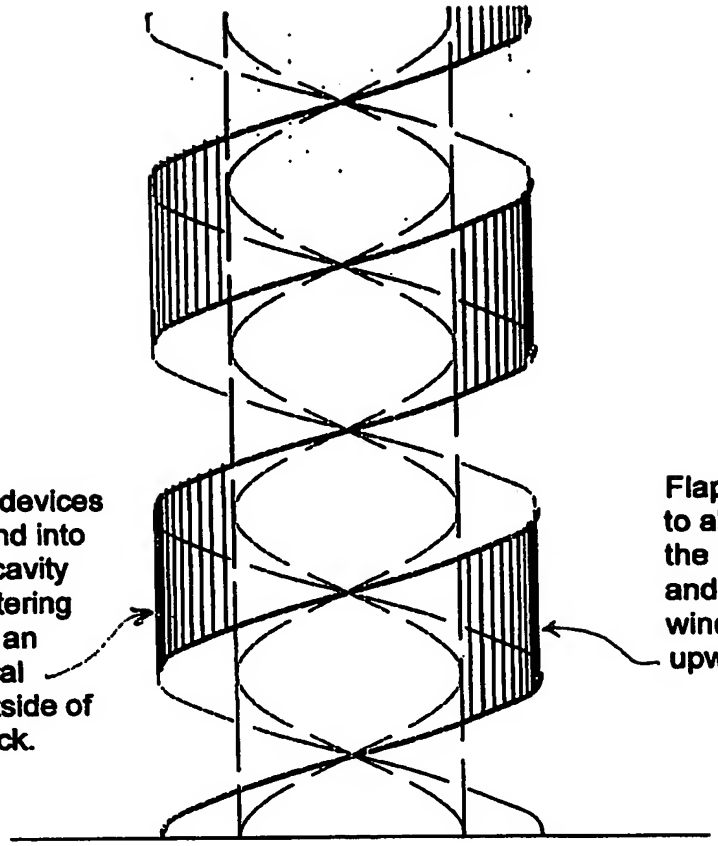


ELEVATION

The double helix wind pump power plant may be used in combination with a large building to concentrate the wind as it flows past the helix structures that may also function as a spiral staircase.



PLAN



Flaps or other devices to allow the wind into the helix type cavity and forcing entering wind to flow in an downward spiral around the outside of the central stack.

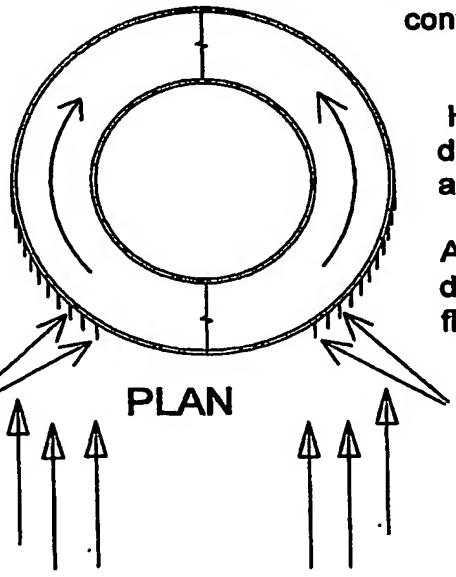
Flaps or other devices to allow the wind into the helix type cavity and forcing entering wind to flow in an upward spiral.

ELEVATION

Central stack within which upward flowing air is induced by the creation of a convection current.

Helix cavity with upward flowing air.

Arrow indicated the direction of air flow.



Helix cavity with downward flowing air.

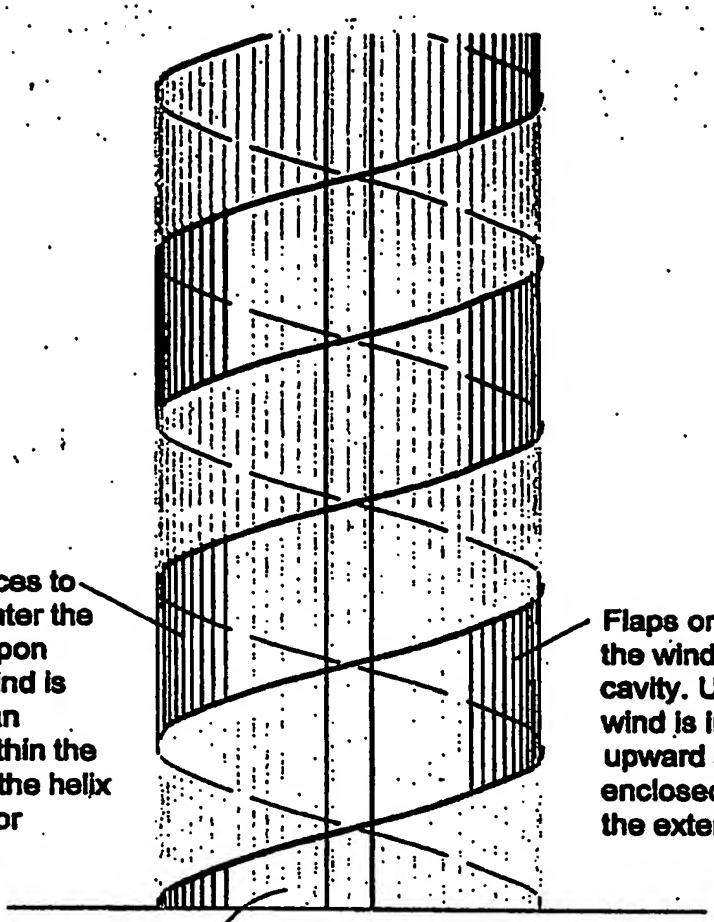
Arrow indicated the direction of air flow.

PLAN

Flaps, wind scoops or the like to capture the passing wind and thus create air movement within the spiral cavity. The same flaps are preferably computer or manually operated so as to maximize the intake of air in such a way as to maximize air movement within the same spiral cavity.

Arrows indicate wind movement

Flaps, wind scoops or the like to capture the passing wind and thus create air movement within the spiral cavity. The same flaps are preferably computer or manually operated so as to maximize the intake of air in such a way as to maximize air movement within the same spiral cavity.



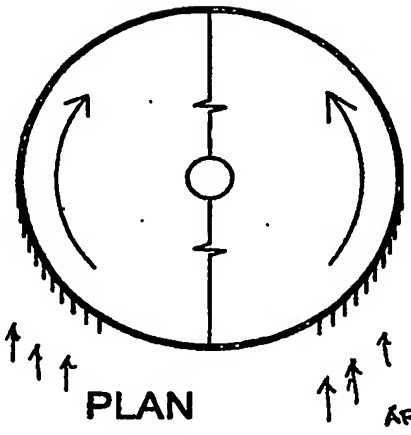
Flaps or other devices to allow the wind to enter the helix type cavity. Upon entering the said wind is induced to flow in an downward spiral within the cavity enclosed by the helix form and the exterior cladding.

Flaps or other devices to allow the wind to enter the helix type cavity. Upon entering the said wind is induced to flow in an upward spiral within the cavity enclosed by the helix form and the exterior cladding.

ELEVATION

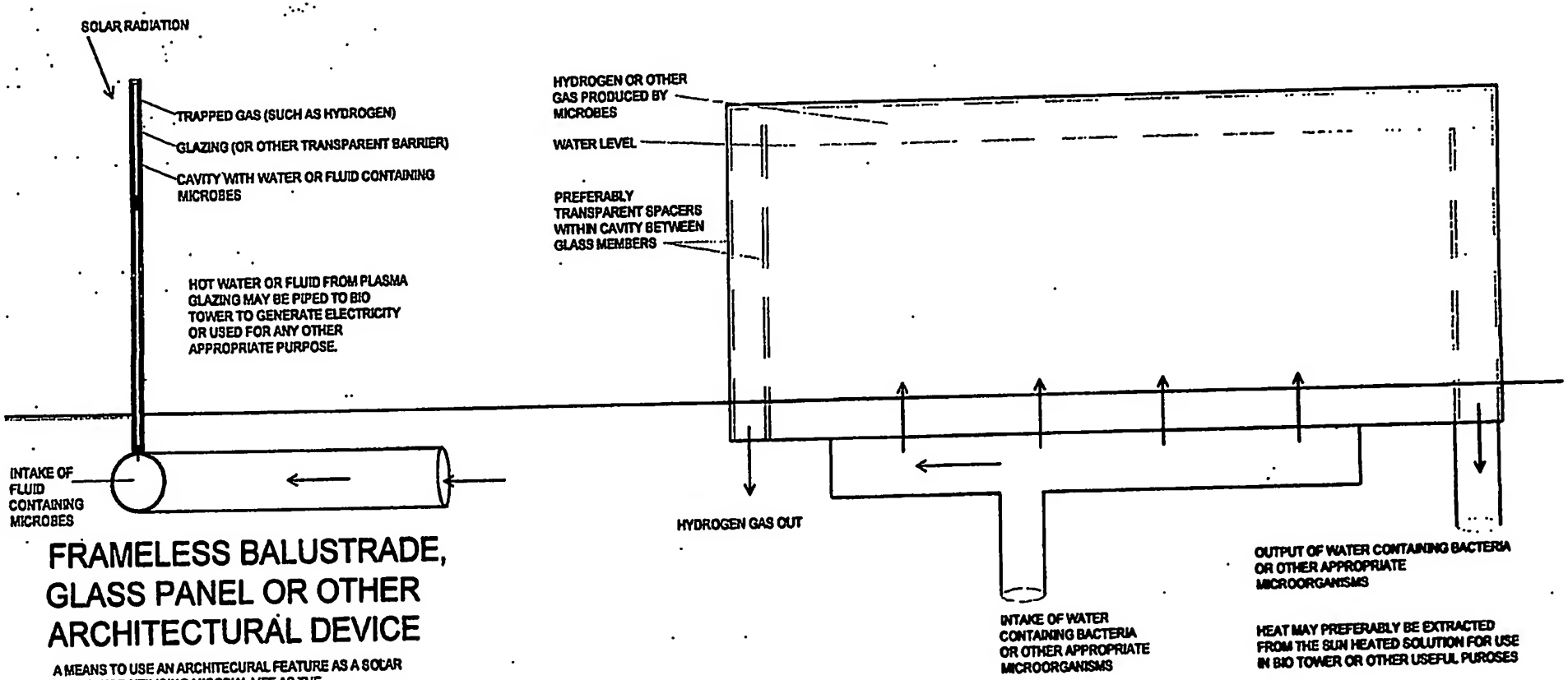
Air output from the helix may be used to drive electricity generating tubines or the like and/or may be used to pump preferably clean air into appropriate places.

Air input into the helix bio tower may be used to drive electricity generating tubines or the like and/or may be used to pump exhausted air from appropriate places.



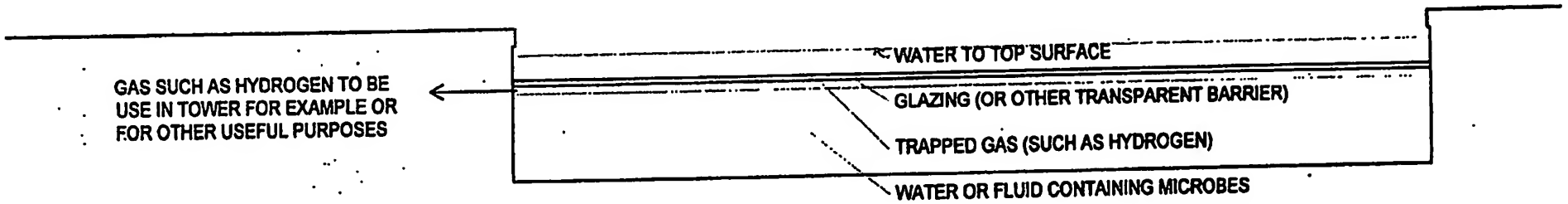
PLAN

ARROWS INDICATE DIRECTION OF WIND



FRAMELESS BALUSTRADE, GLASS PANEL OR OTHER ARCHITECTURAL DEVICE

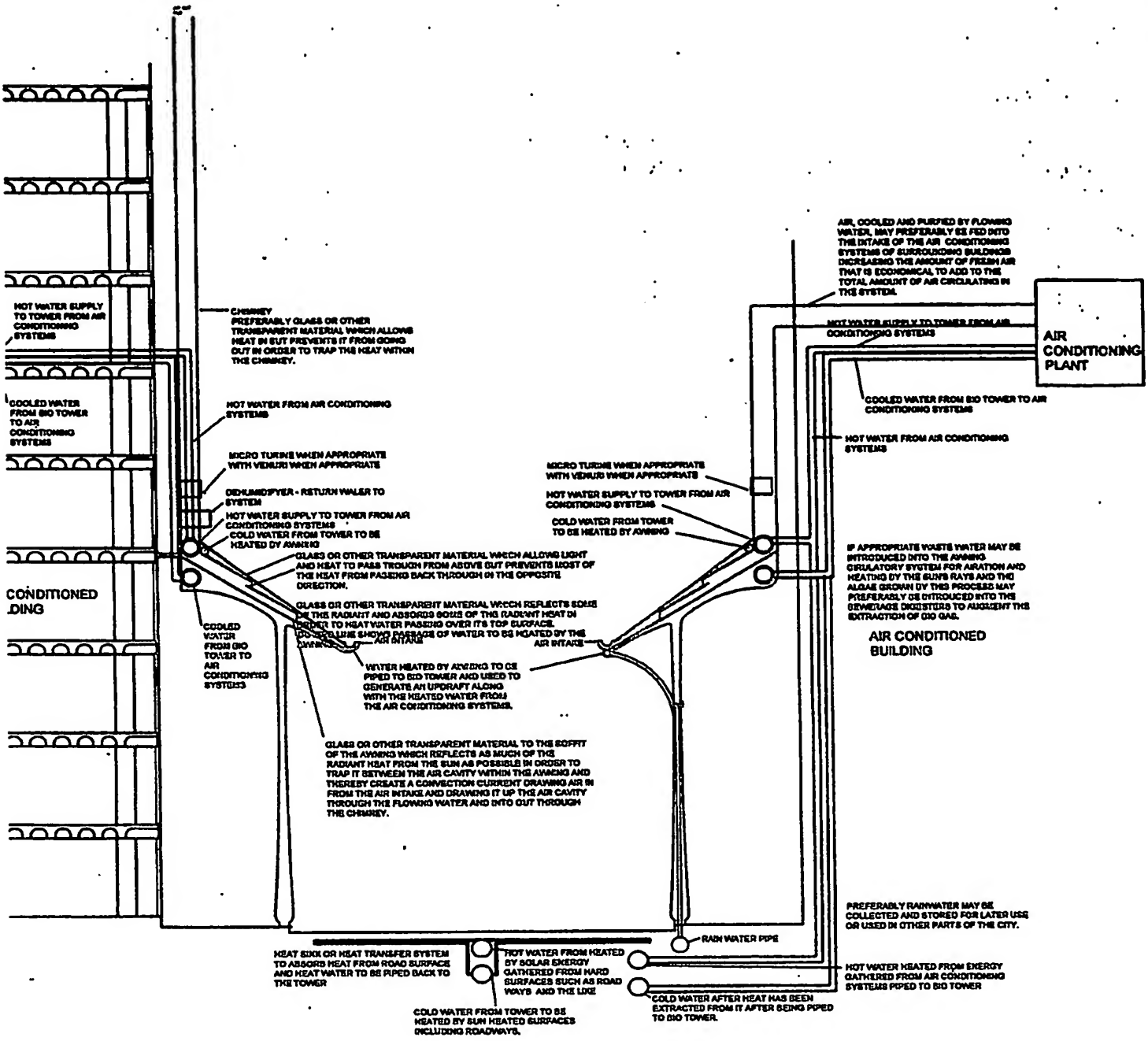
A MEANS TO USE AN ARCHITECURAL FEATURE AS A SOLAR COLLECTOR UTILISING MICOBIAL LIFE AS THE PHOTOSYSTNESISING MEDIUM.

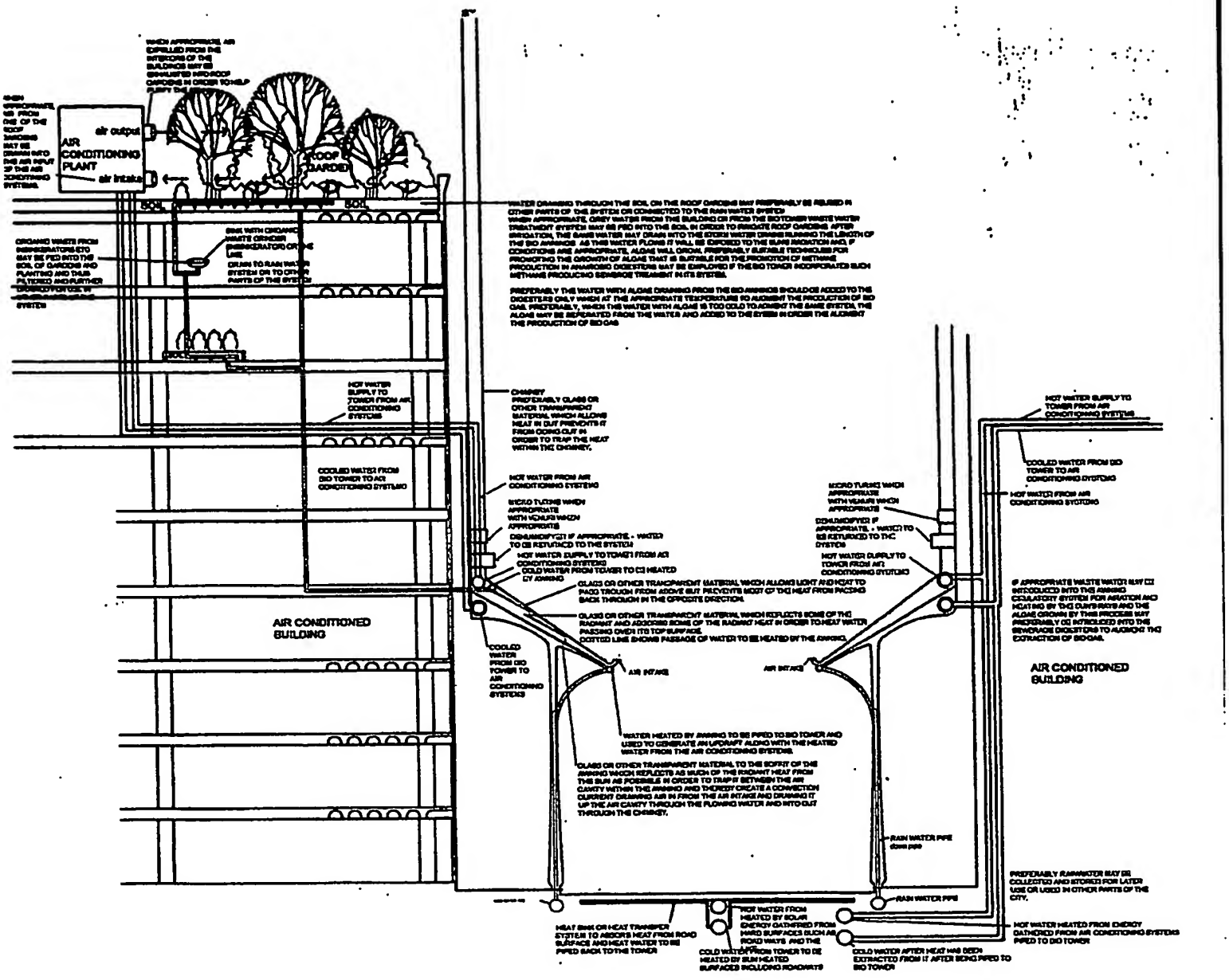


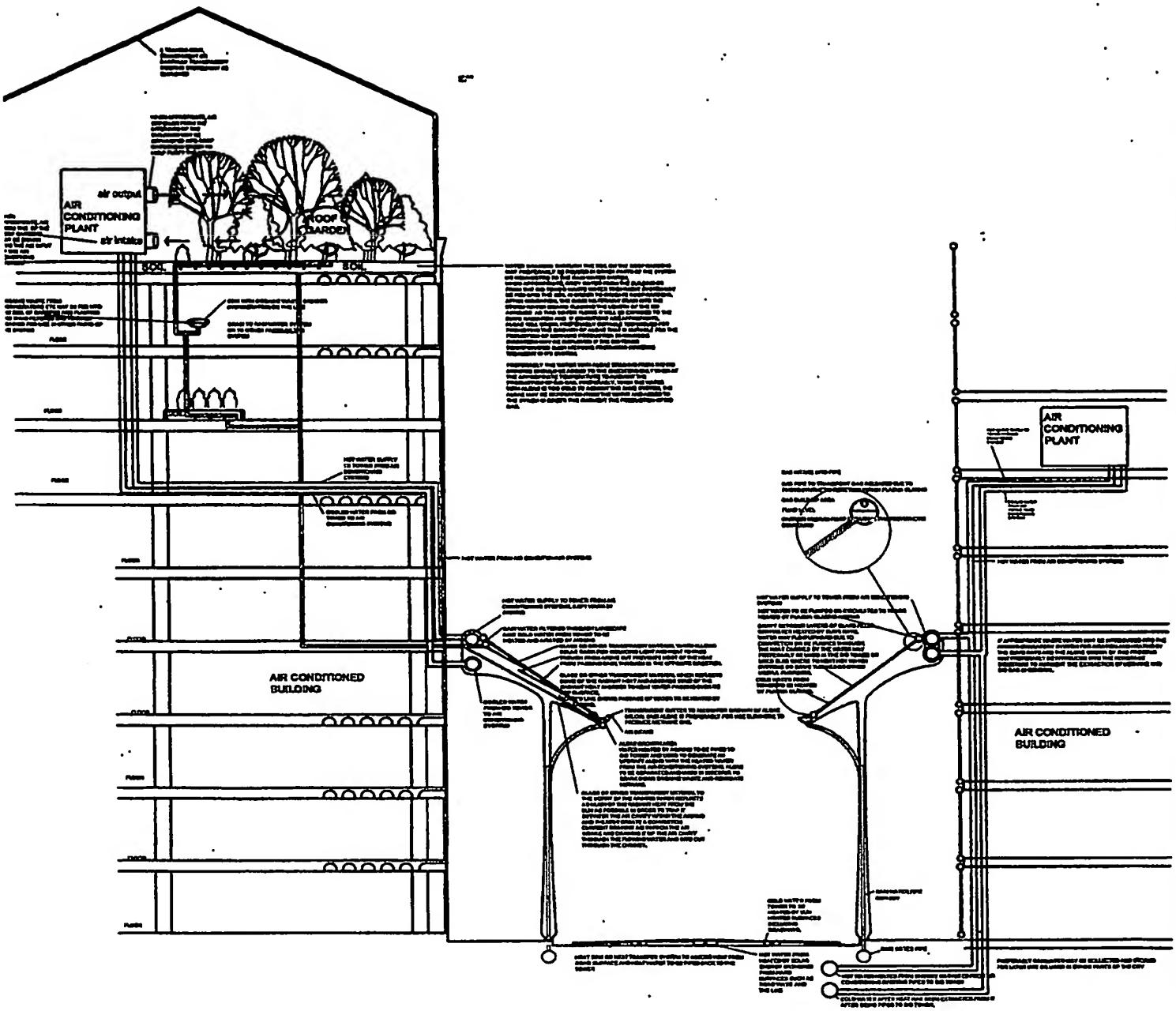
A solar radiation collector designed to expose a carrier medium such as water or a water based synthetic complex to solar radiation within one or more cavities between or covered by one or more layers of glass or other preferably transparent or semi opaque material, the said water preferably contains man-made compounds able to harvest solar energy and to use it to produce hydrogen from water through a process of artificial photosynthesis. This said artificial photosynthesis for hydrogen production from sunlight and water by direct photochemistry in synthetic complexes preferably should produce hydrogen (or other fuels) from solar energy and water. The heat or trapped in the said water, due to its exposure to said solar radiation, may then be circulated or transported to other devices via pipes or ducts or the like, which may extract the same heat and use it for useful purposes or store the liquid for later use; the said solar radiation collector should preferably be useable as an architectural element such as a pond or water feature, balustrade. The hydrogen or other useful substance produced via this said process of photosynthesis should preferably be captured by the said solar radiation collector and piped away for use or storage or may also be captured whilst the said carrier medium is being circulated or stored.

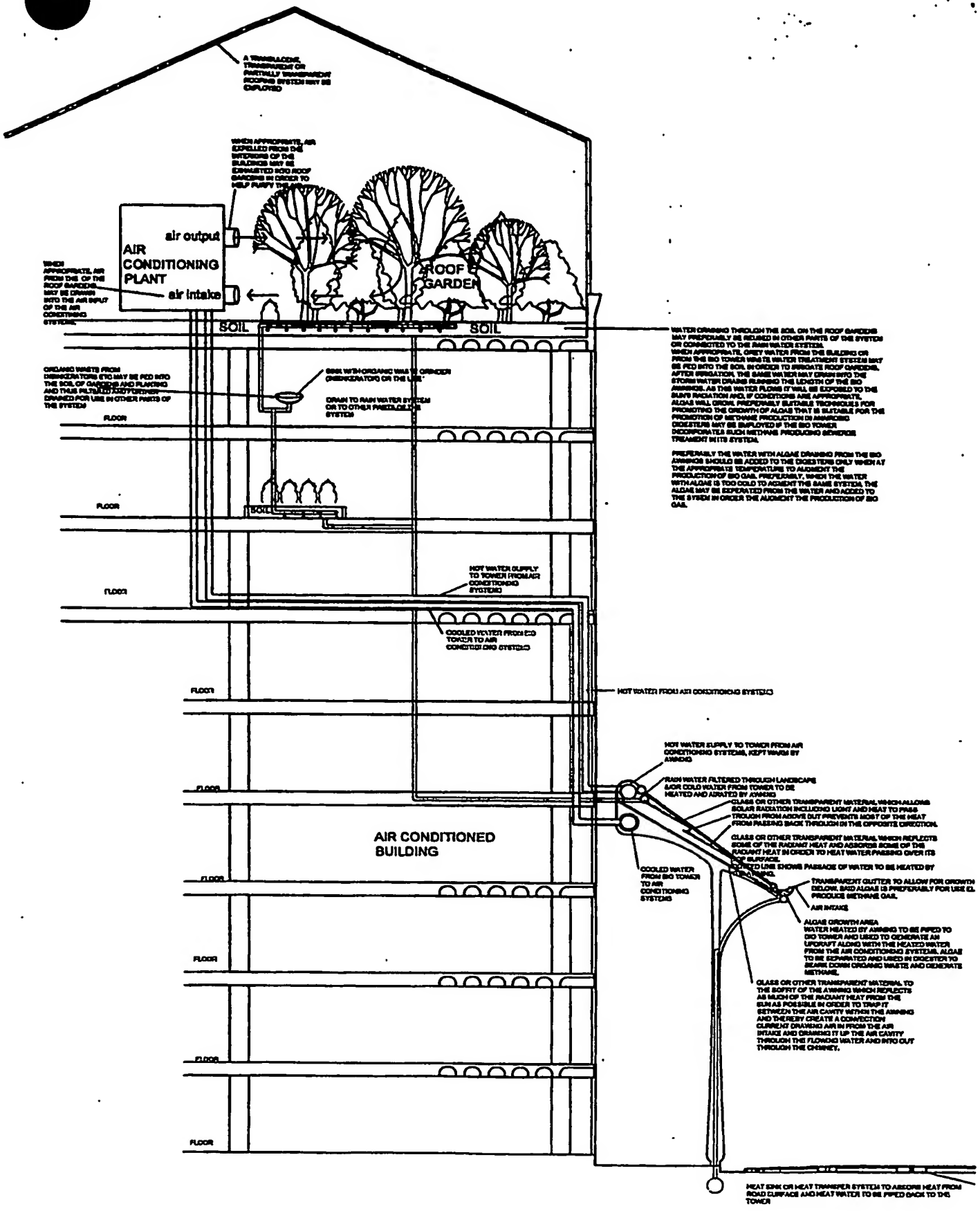
REFLECTION POOL SOLAR COLLECTOR

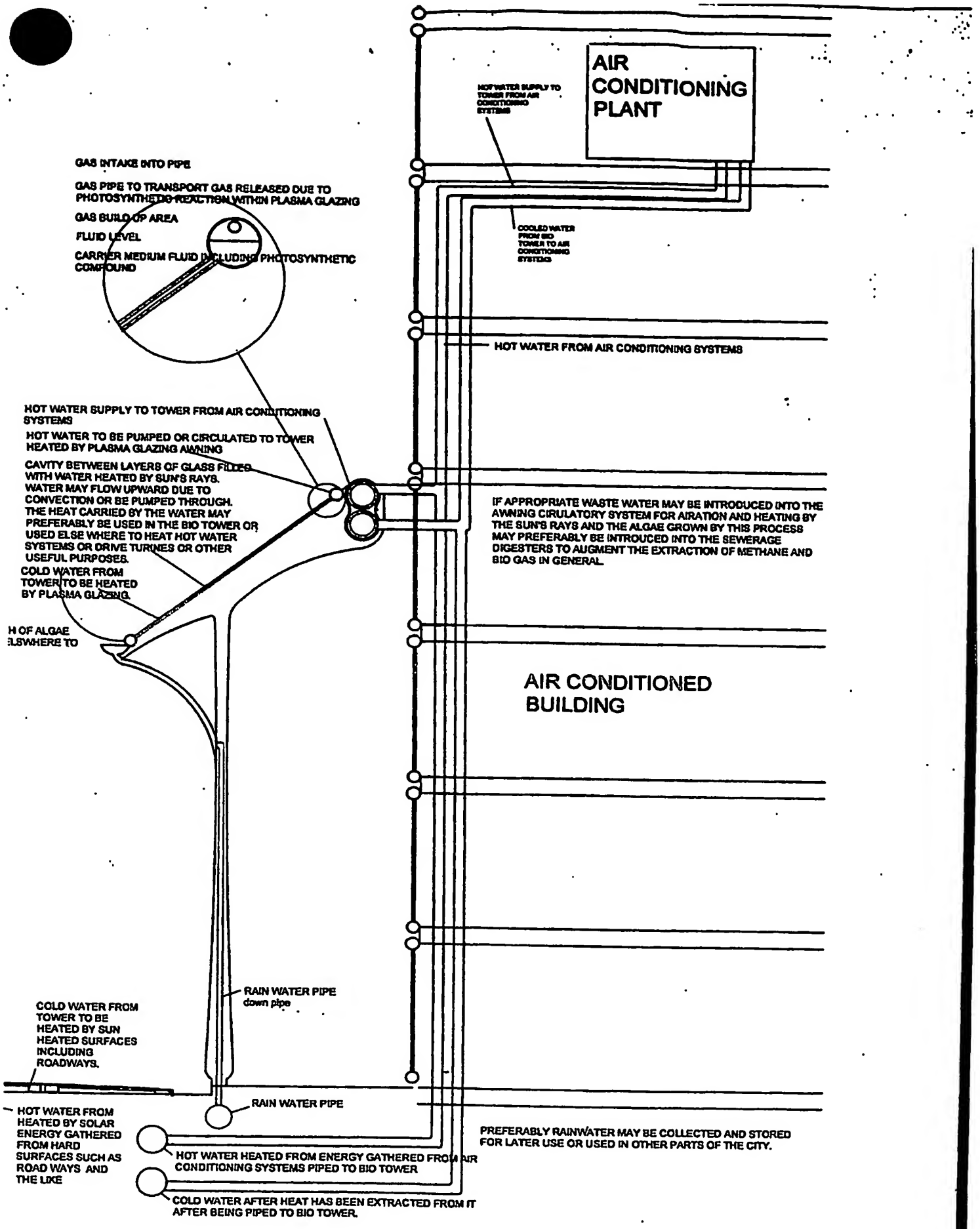
A MEANS TO USE AN ARCHITECURAL FEATURE AS A SOLAR COLLECTOR UTILISING MICOBIAL LIFE AS THE PHOTOSYSTNESISING MEDIUM.

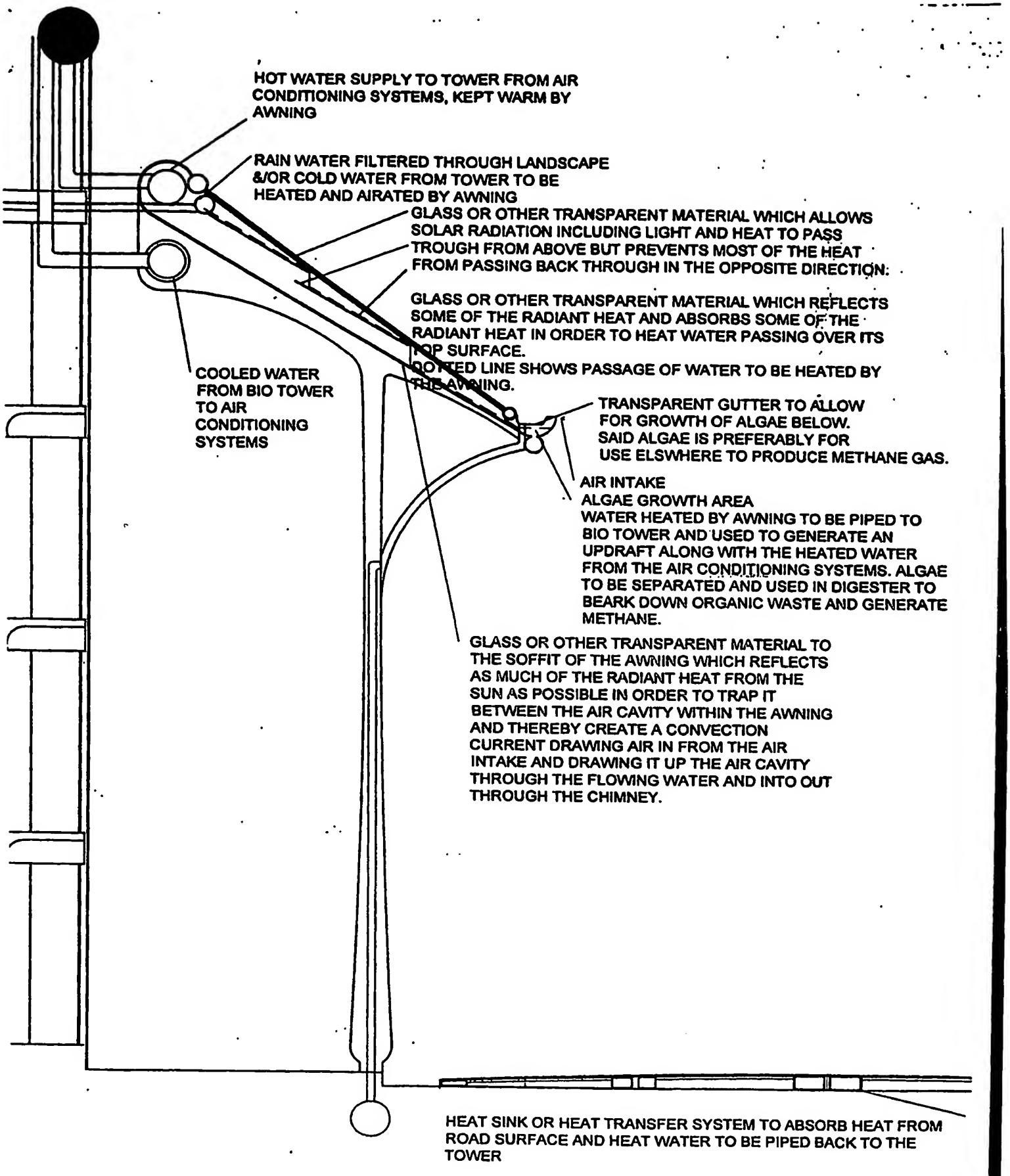

AIR, COOLED AND PURIFIED BY FLOWING WATER, MAY PREFERABLY BE FED INTO THE INTAKE OF THE AIR CONDITIONING SYSTEMS OF SURROUNDING BUILDINGS INCREASING THE AMOUNT OF FRESH AIR THAT IS ECONOMICAL TO ADD TO THE TOTAL AMOUNT OF AIR CIRCULATING IN THE SYSTEM.
HOT WATER SUPPLY TO TOWER FROM AIR CONDITIONING SYSTEMS
AIR CONDITIONING PLANT
HOT WATER SUPPLY TO TOWER FROM AIR CONDITIONING SYSTEMS
CHIMNEY PREFERABLY GLASS OR OTHER TRANSPARENT MATERIAL WHICH ALLOWS HEAT IN BUT PREVENTS IT FROM GOING OUT IN ORDER TO TRAP THE HEAT WITHIN THE CHIMNEY.
COOLED WATER FROM BIO TOWER TO AIR CONDITIONING SYSTEMS
COOLED WATER FROM BIO TOWER TO AIR CONDITIONING SYSTEMS
HOT WATER FROM AIR CONDITIONING SYSTEMS
HOT WATER FROM AIR CONDITIONING SYSTEMS
MICRO TURINE WHEN APPROPRIATE WITH VENURI WHEN APPROPRIATE
MICRO TURINE WHEN APPROPRIATE WITH VENURI WHEN APPROPRIATE
DEHUMIDIFYER - RETURN WATER TO SYSTEM
HOT WATER SUPPLY TO TOWER FROM AIR CONDITIONING SYSTEMS
COLD WATER FROM TOWER TO BE HEATED BY AWNING
HOT WATER SUPPLY TO TOWER FROM AIR CONDITIONING SYSTEMS
COLD WATER FROM TOWER TO BE HEATED BY AWNING
GLASS OR OTHER TRANSPARENT MATERIAL WHICH ALLOWS LIGHT AND HEAT TO PASS THROUGH FROM ABOVE BUT PREVENTS MOST OF THE HEAT FROM PASSING BACK THROUGH IN THE OPPOSITE DIRECTION.
IF APPROPRIATE WASTE WATER MAY BE INTRODUCED INTO THE AWNING CIRCULATORY SYSTEM FOR AIRATION AND HEATING BY THE SUNS RAYS AND THE ALGAE GROWN BY THIS PROCESS MAY PREFERABLY BE INTRODUCED INTO THE SEWERAGE DIGESTERS TO AUGMENT THE EXTRACTION OF BIO GAS.
CONDITIONED DING
GLASS OR OTHER TRANSPARENT MATERIAL WHICH REFLECTS SOME OF THE RADIANT AND ABSORBS SOME OF THE RADIANT HEAT IN ORDER TO HEAT WATER PASSING OVER ITS TOP SURFACE. CROSS-SECTION SHOWS PASSAGE OF WATER TO BE HEATED BY THE AIR INTAKE
COOLED WATER FROM BIO TOWER TO AIR CONDITIONING SYSTEMS
AIR INTAKE
AIR CONDITIONED BUILDING
WATER HEATED BY AWNING TO BE PIPED TO BIO TOWER AND USED TO GENERATE AN UPDRAFT ALONG WITH THE HEATED WATER FROM THE AIR CONDITIONING SYSTEMS.
GLASS OR OTHER TRANSPARENT MATERIAL TO THE SOFFIT OF THE AWNING WHICH REFLECTS AS MUCH OF THE RADIANT HEAT FROM THE SUN AS POSSIBLE IN ORDER TO TRAP IT BETWEEN THE AIR CAVITY WITHIN THE AWNING AND THEREBY CREATE A CONVECTION CURRENT DRAWING AIR IN FROM THE AIR INTAKE AND DRAWING IT UP THE AIR CAVITY THROUGH THE FLOWING WATER AND INTO OUT THROUGH THE CHIMNEY.
PREFERABLY RAINWATER MAY BE COLLECTED AND STORED FOR LATER USE OR USED IN OTHER PARTS OF THE CITY.
RAIN WATER PIPE
HEAT SINK OR HEAT TRANSFER SYSTEM TO ABSORB HEAT FROM ROAD SURFACE AND HEAT WATER TO BE PIPED BACK TO THE TOWER
HOT WATER FROM HEATED BY SOLAR ENERGY GATHERED FROM HARD SURFACES SUCH AS ROAD WAYS AND THE LIKE
HOT WATER HEATED FROM ENERGY GATHERED FROM AIR CONDITIONING SYSTEMS PIPED TO BIO TOWER
COLD WATER AFTER HEAT HAS BEEN EXTRACTED FROM IT AFTER BEING PIPED TO BIO TOWER.
COLD WATER FROM TOWER TO BE HEATED BY SUN HEATED SURFACES INCLUDING ROADWAYS.

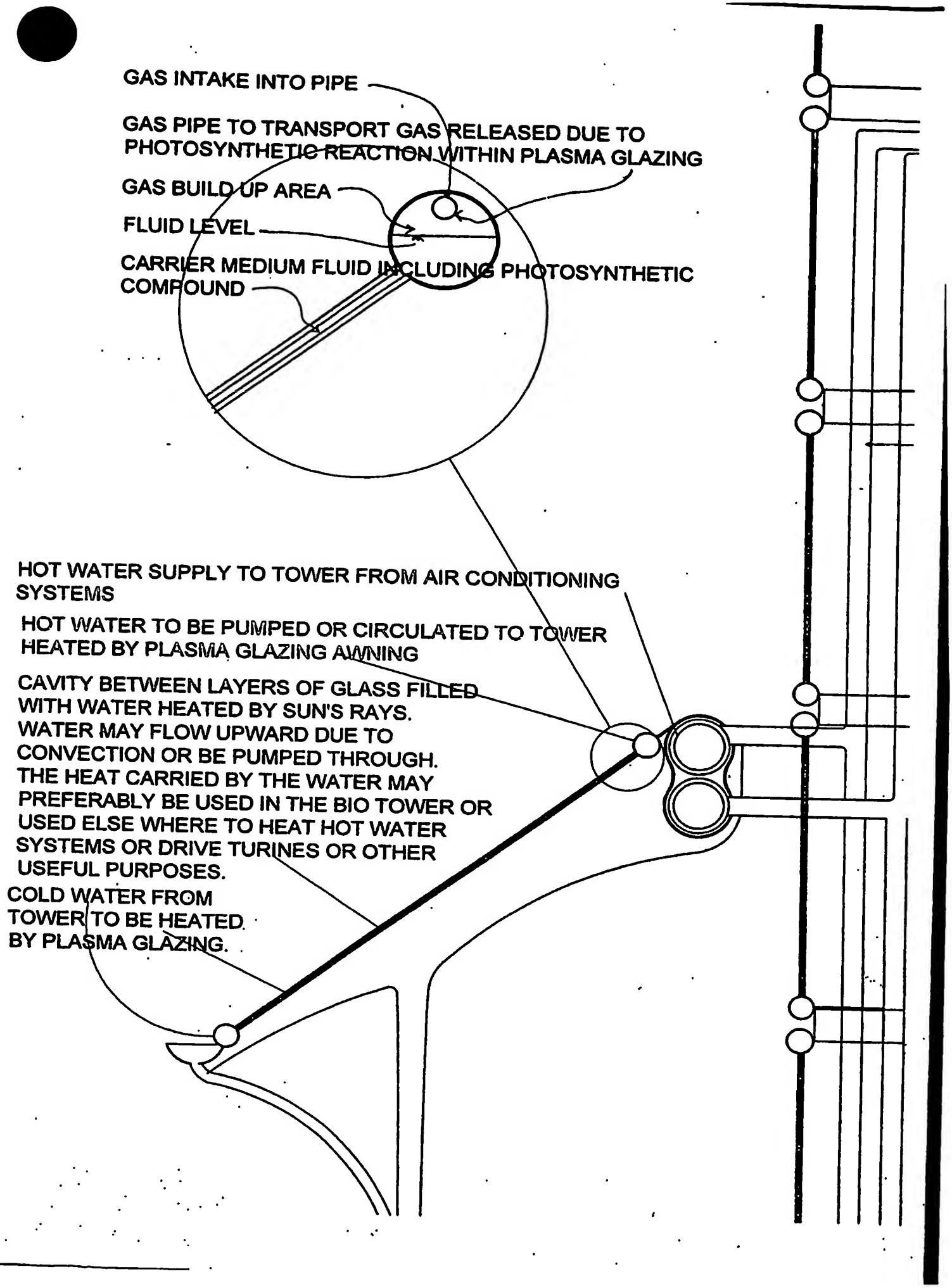

air output
AIR CONDITIONING PLANT
air intake
ROOF GARDEN
SOIL
SOIL
AIR CONDITIONED BUILDING
AIR CONDITIONED BUILDING
AIR INTAKE
AIR INTAKE
RAIN WATER PIPE
RAIN WATER PIPE

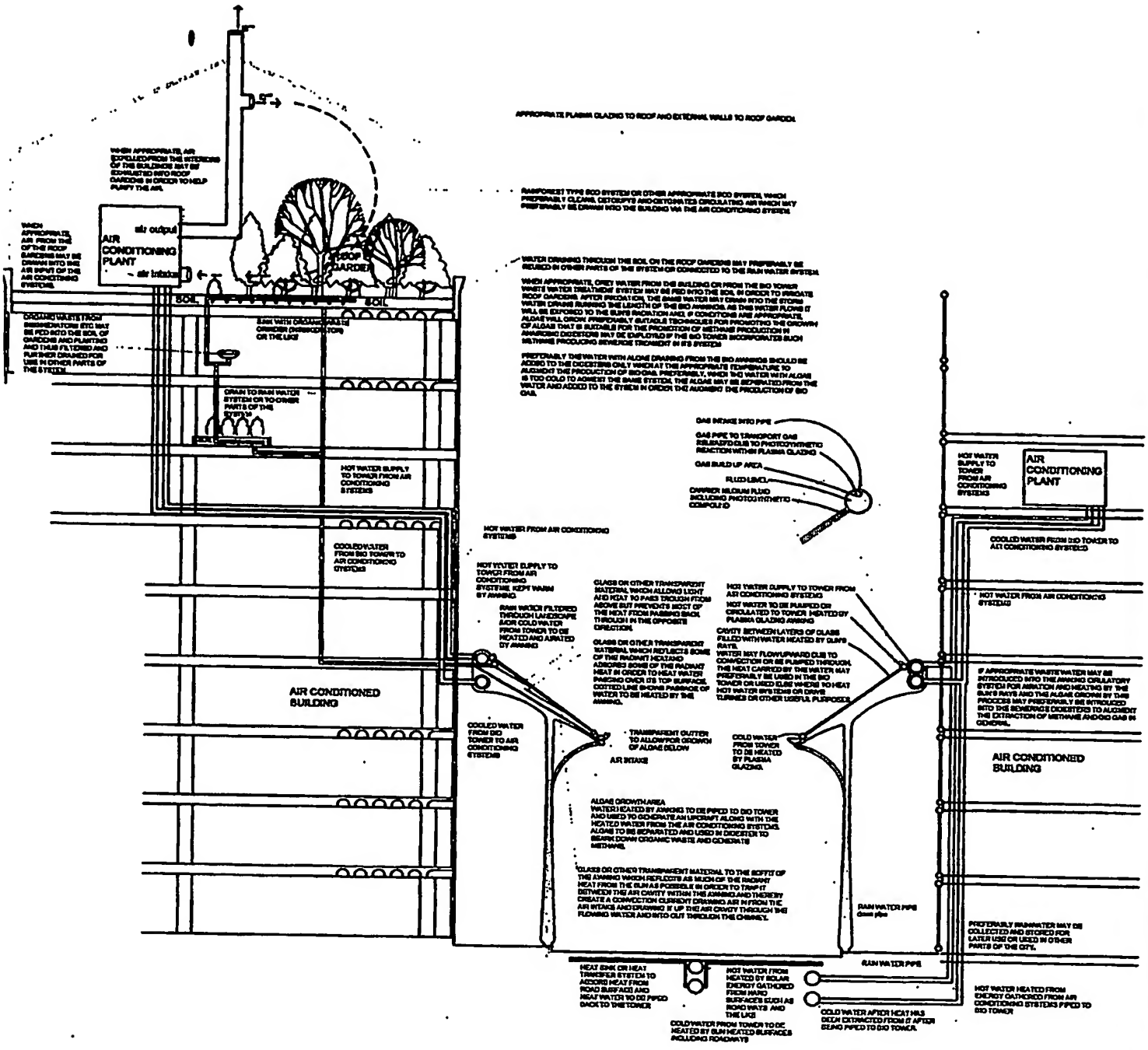

air output
AIR CONDITIONING PLANT
air intake
ROOF GARDEN
SOIL
SOIL
AIR CONDITIONED BUILDING
AIR CONDITIONING PLANT
AIR CONDITIONED BUILDING

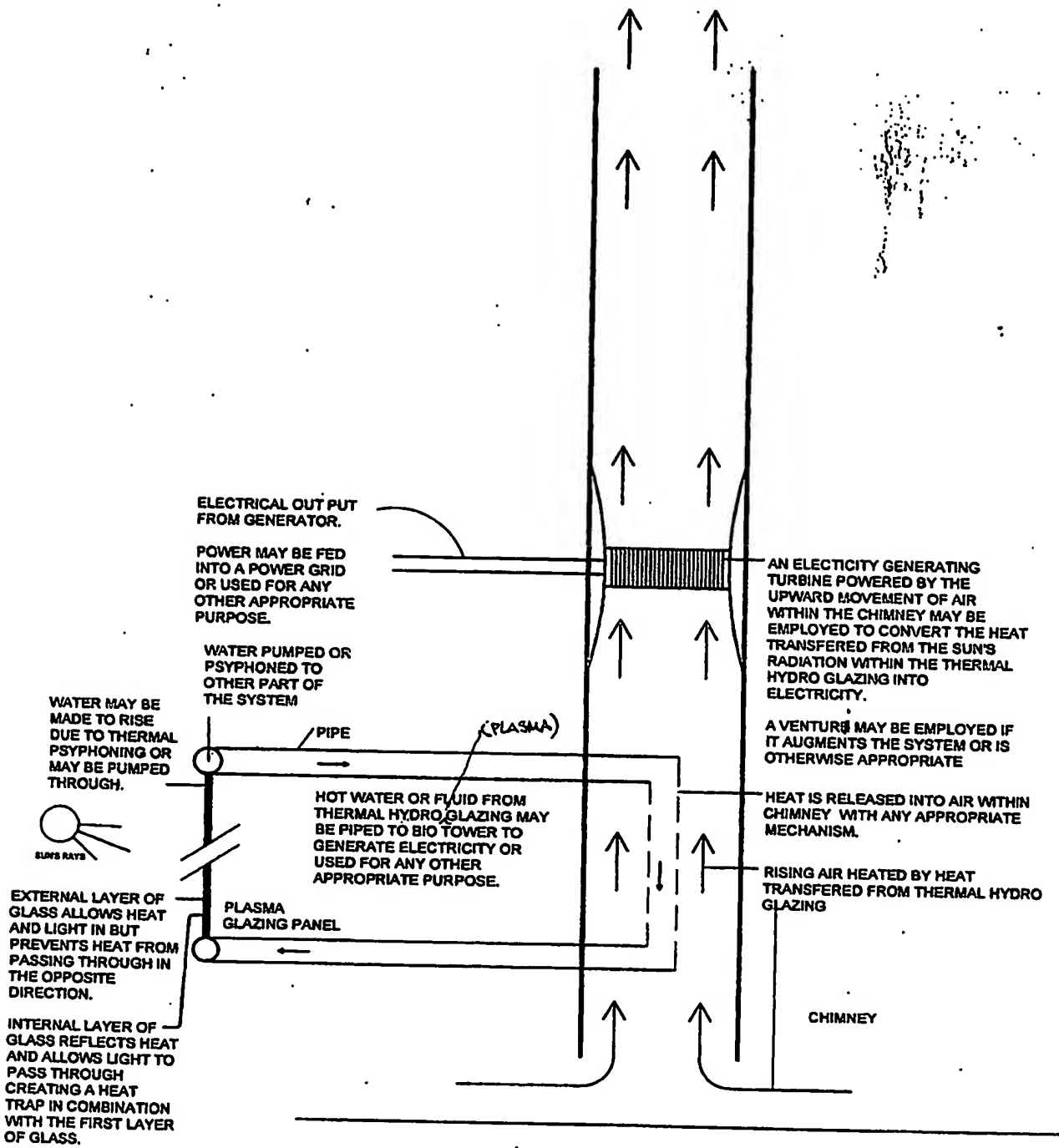

air output
AIR CONDITIONING PLANT
air intake
ROOF GARDEN
SOIL
SOIL
FLOOR
FLOOR
FLOOR
FLOOR
FLOOR
FLOOR
FLOOR
FLOOR
AIR CONDITIONED BUILDING


AIR CONDITIONING PLANT
HOT WATER SUPPLY TO TOWER FROM AIR CONDITIONING SYSTEMS
COOLED WATER FROM BIO TOWER TO AIR CONDITIONING SYSTEMS
GAS INTAKE INTO PIPE
GAS PIPE TO TRANSPORT GAS RELEASED DUE TO PHOTOSYNTHETIC REACTION WITHIN PLASMA GLAZING
GAS BUILD UP AREA
FLUID LEVEL
CARRIER MEDIUM FLUID INCLUDING PHOTOSYNTHETIC COMPOUND
HOT WATER FROM AIR CONDITIONING SYSTEMS
HOT WATER SUPPLY TO TOWER FROM AIR CONDITIONING SYSTEMS
HOT WATER TO BE PUMPED OR CIRCULATED TO TOWER HEATED BY PLASMA GLAZING AWNING
CAVITY BETWEEN LAYERS OF GLASS FILLED WITH WATER HEATED BY SUN'S RAYS. WATER MAY FLOW UPWARD DUE TO CONVECTION OR BE PUMPED THROUGH. THE HEAT CARRIED BY THE WATER MAY PREFERABLY BE USED IN THE BIO TOWER OR USED ELSE WHERE TO HEAT HOT WATER SYSTEMS OR DRIVE TURINES OR OTHER USEFUL PURPOSES.
COLD WATER FROM TOWER TO BE HEATED BY PLASMA GLAZING.
H OF ALGAE
LSWHERE TO
IF APPROPRIATE WASTE WATER MAY BE INTRODUCED INTO THE AWNING CIRULATORY SYSTEM FOR AIRATION AND HEATING BY THE SUN'S RAYS AND THE ALGAE GROWN BY THIS PROCESS MAY PREFERABLY BE INTROUCED INTO THE SEWERAGE DIGESTERS TO AUGMENT THE EXTRACTION OF METHANE AND BIO GAS IN GENERAL.
AIR CONDITIONED BUILDING
RAIN WATER PIPE
down pipe
COLD WATER FROM TOWER TO BE HEATED BY SUN HEATED SURFACES INCLUDING ROADWAYS.
RAIN WATER PIPE
HOT WATER FROM HEATED BY SOLAR ENERGY GATHERED FROM HARD SURFACES SUCH AS ROAD WAYS AND THE LIKE
PREFERABLY RAINWATER MAY BE COLLECTED AND STORED FOR LATER USE OR USED IN OTHER PARTS OF THE CITY.
HOT WATER HEATED FROM ENERGY GATHERED FROM AIR CONDITIONING SYSTEMS PIPED TO BIO TOWER
COLD WATER AFTER HEAT HAS BEEN EXTRACTED FROM IT AFTER BEING PIPED TO BIO TOWER.

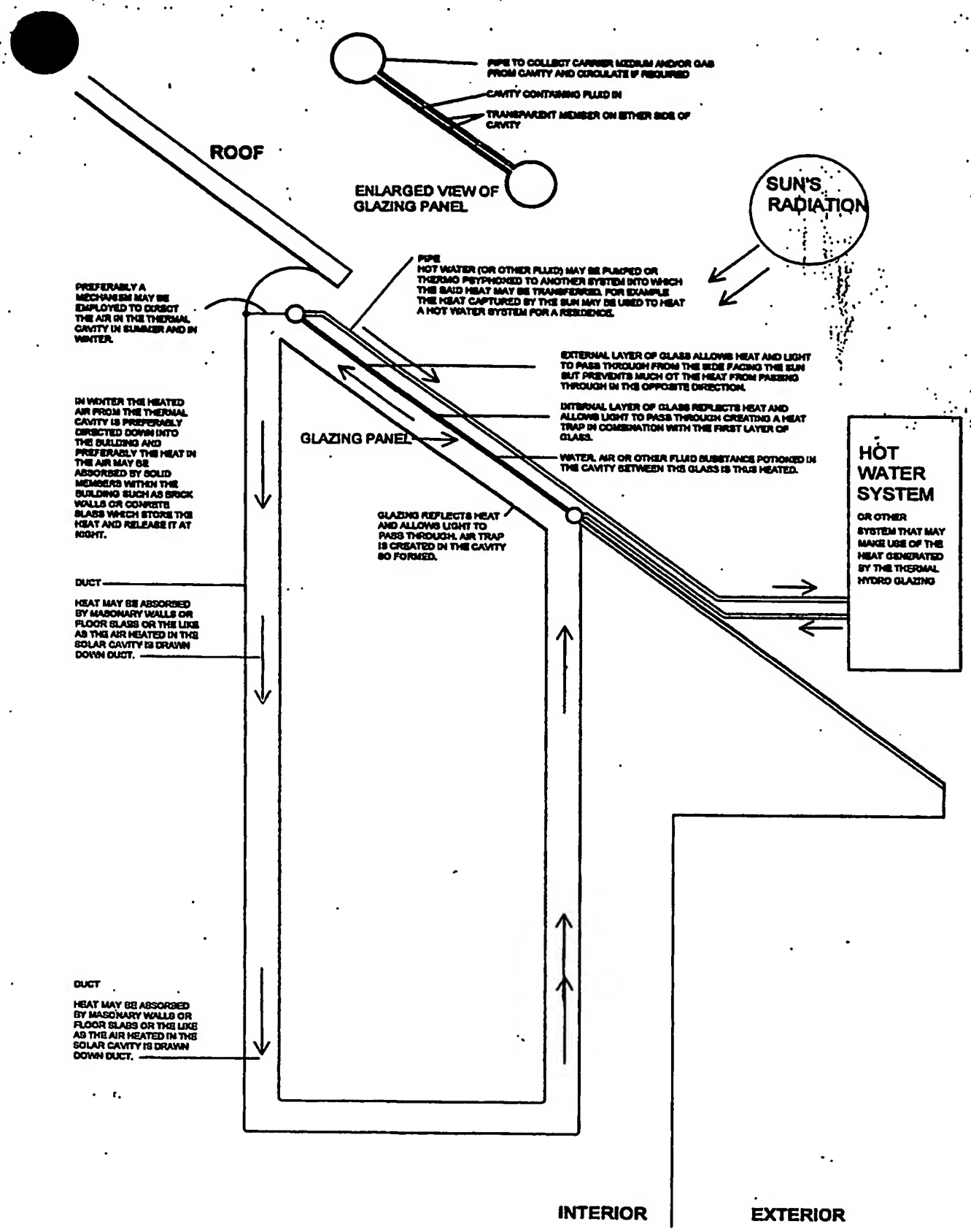

HOT WATER SUPPLY TO TOWER FROM AIR CONDITIONING SYSTEMS, KEPT WARM BY AWNING
RAIN WATER FILTERED THROUGH LANDSCAPE &/OR COLD WATER FROM TOWER TO BE HEATED AND AIRATED BY AWNING
GLASS OR OTHER TRANSPARENT MATERIAL WHICH ALLOWS SOLAR RADIATION INCLUDING LIGHT AND HEAT TO PASS TROUGH FROM ABOVE BUT PREVENTS MOST OF THE HEAT FROM PASSING BACK THROUGH IN THE OPPOSITE DIRECTION.
GLASS OR OTHER TRANSPARENT MATERIAL WHICH REFLECTS SOME OF THE RADIANT HEAT AND ABSORBS SOME OF THE RADIANT HEAT IN ORDER TO HEAT WATER PASSING OVER ITS TOP SURFACE.
DOTTED LINE SHOWS PASSAGE OF WATER TO BE HEATED BY THIS AWNING.
COOLED WATER FROM BIO TOWER TO AIR CONDITIONING SYSTEMS
TRANSPARENT GUTTER TO ALLOW FOR GROWTH OF ALGAE BELOW. SAID ALGAE IS PREFERABLY FOR USE ELSWHERE TO PRODUCE METHANE GAS.
AIR INTAKE
ALGAE GROWTH AREA
WATER HEATED BY AWNING TO BE PIPED TO BIO TOWER AND USED TO GENERATE AN UPDRAFT ALONG WITH THE HEATED WATER FROM THE AIR CONDITIONING SYSTEMS. ALGAE TO BE SEPARATED AND USED IN DIGESTER TO BEARK DOWN ORGANIC WASTE AND GENERATE METHANE.
GLASS OR OTHER TRANSPARENT MATERIAL TO THE SOFFIT OF THE AWNING WHICH REFLECTS AS MUCH OF THE RADIANT HEAT FROM THE SUN AS POSSIBLE IN ORDER TO TRAP IT BETWEEN THE AIR CAVITY WITHIN THE AWNING AND THEREBY CREATE A CONVECTION CURRENT DRAWING AIR IN FROM THE AIR INTAKE AND DRAWING IT UP THE AIR CAVITY THROUGH THE FLOWING WATER AND INTO OUT THROUGH THE CHIMNEY.
HEAT SINK OR HEAT TRANSFER SYSTEM TO ABSORB HEAT FROM ROAD SURFACE AND HEAT WATER TO BE PIPED BACK TO THE TOWER


GAS INTAKE INTO PIPE
GAS PIPE TO TRANSPORT GAS RELEASED DUE TO PHOTOSYNTHETIC REACTION WITHIN PLASMA GLAZING
GAS BUILD UP AREA
FLUID LEVEL
CARRIER MEDIUM FLUID INCLUDING PHOTOSYNTHETIC COMPOUND
HOT WATER SUPPLY TO TOWER FROM AIR CONDITIONING SYSTEMS
HOT WATER TO BE PUMPED OR CIRCULATED TO TOWER HEATED BY PLASMA GLAZING AWNING
CAVITY BETWEEN LAYERS OF GLASS FILLED WITH WATER HEATED BY SUN'S RAYS. WATER MAY FLOW UPWARD DUE TO CONVECTION OR BE PUMPED THROUGH. THE HEAT CARRIED BY THE WATER MAY PREFERABLY BE USED IN THE BIO TOWER OR USED ELSE WHERE TO HEAT HOT WATER SYSTEMS OR DRIVE TURINES OR OTHER USEFUL PURPOSES.
COLD WATER FROM TOWER TO BE HEATED BY PLASMA GLAZING.

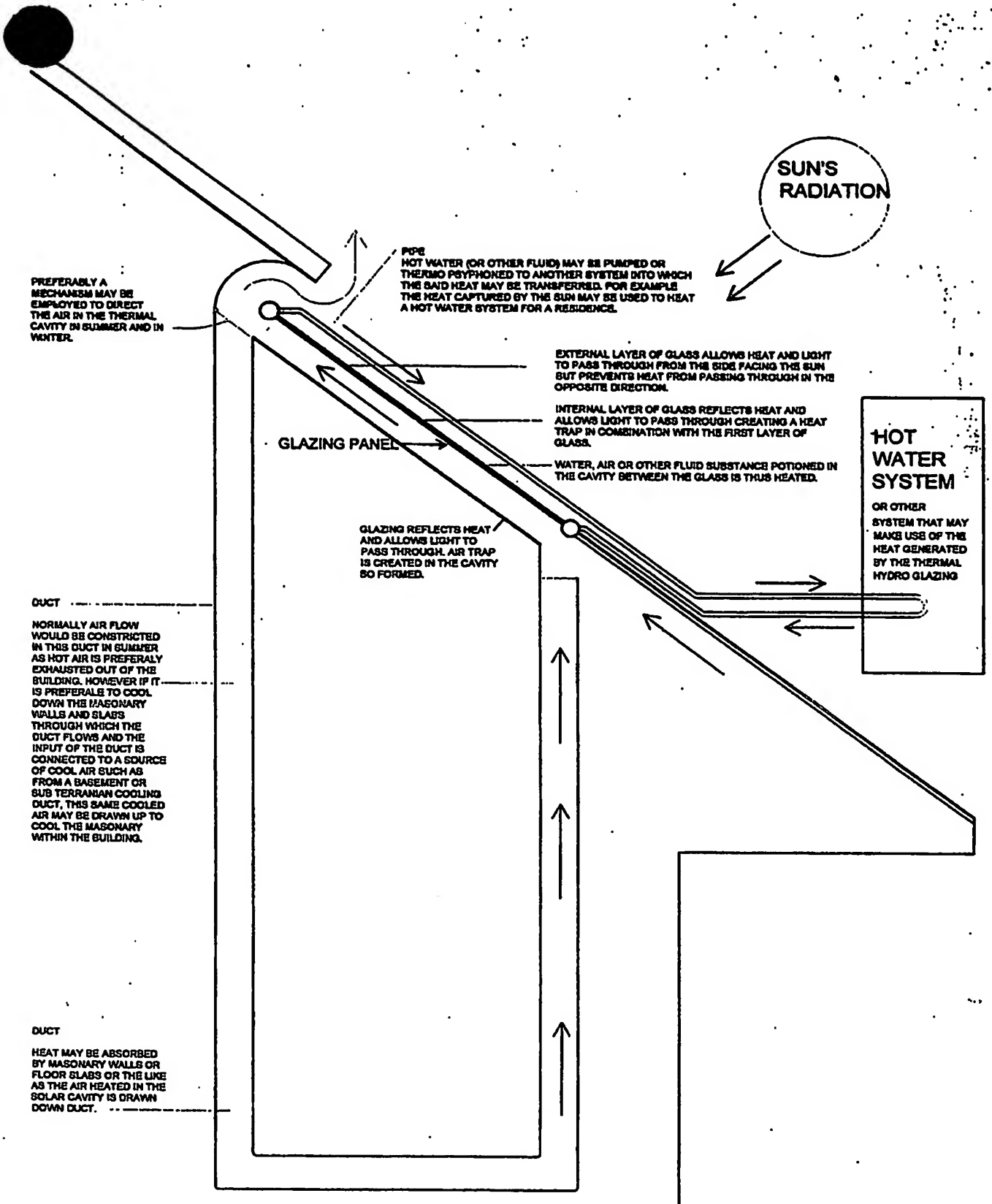

AIR CONDITIONING PLANT
air output
air intake
ROOF GARDEN
SOIL
SOIL
AIR CONDITIONED BUILDING
AIR CONDITIONED BUILDING
AIR CONDITIONING PLANT
HOT WATER SUPPLY TO TOWER FROM AIR CONDITIONING SYSTEMS
COOLED WATER FROM BIO TOWER TO AIR CONDITIONING SYSTEMS
HOT WATER FROM AIR CONDITIONING SYSTEMS
HOT WATER SUPPLY TO TOWER FROM AIR CONDITIONING SYSTEMS, KEPT WARM BY AWNING
COOLED WATER FROM BIO TOWER TO AIR CONDITIONING SYSTEMS
AIR INTAKE
TRANSPARENT GUTTER TO ALLOW FOR GROWTH OF ALGAE BELOW
ALGAE GROWTH AREA
HEAT SINK OR HEAT TRANSFER SYSTEM TO ABSORB HEAT FROM ROAD SURFACE AND HEAT WATER TO BE PIPED BACK TO THE TOWER
COLD WATER FROM TOWER TO BE HEATED BY SUN HEATED SURFACES INCLUDING ROADWAYS
HOT WATER FROM HEATED BY SOLAR ENERGY GATHERED FROM HARD SURFACES SUCH AS ROADWAYS AND THE LIKE
COLD WATER AFTER HEAT HAS BEEN EXTRACTED FROM IT AFTER BEING PIPED TO BIO TOWER
RAIN WATER PIPE
RAIN WATER PIPE
HOT WATER HEATED FROM ENERGY GATHERED FROM AIR CONDITIONING SYSTEMS PIPED TO BIO TOWER
PREFERABLY RAINWATER MAY BE COLLECTED AND STORED FOR LATER USE OR USED IN OTHER PARTS OF THE CITY.
IF APPROPRIATE WASTE WATER MAY BE INTRODUCED INTO THE AWNING CIRULATORY SYSTEM FOR AERATION AND HEATING BY THE SUN'S RAYS AND THE ALGAE GROWN BY THIS PROCESS MAY PREFERABLY BE INTRODUCED INTO THE BIOHEDGE DIGESTERS TO AUGMENT THE EXTRACTION OF METHANE AND/OR GAS IN GENERAL.
HOT WATER SUPPLY TO TOWER FROM AIR CONDITIONING SYSTEMS
COOLED WATER FROM BIO TOWER TO AIR CONDITIONING SYSTEMS
HOT WATER FROM AIR CONDITIONING SYSTEMS
HOT WATER TO BE PUMPED OR CIRCULATED TO TOWER HEATED BY PLASMA GLAZING AWNING
CAVITY BETWEEN LAYERS OF GLASS FILLED WITH WATER HEATED BY SUN'S RAYS. WATER MAY FLOW UPWARD DUE TO CONVECTION OR BE PUMPED THROUGH. THE HEAT CARRIED BY THE WATER MAY PREFERABLY BE USED IN THE BIO TOWER OR USED ELSE WHERE TO HEAT HOT WATER SYSTEMS OR DRIVE TURBINES OR OTHER USEFUL PURPOSES
GLASS OR OTHER TRANSPARENT MATERIAL WHICH ALLOWS LIGHT AND HEAT TO PASS THROUGH FROM ABOVE BUT PREVENTS MOST OF THE HEAT FROM PASSING BACK THROUGH IN THE OPPOSITE DIRECTION.
GLASS OR OTHER TRANSPARENT MATERIAL WHICH REFLECTS SOME OF THE RADIANT HEATING ABSORBS SOME OF THE RADIANT HEAT IN ORDER TO HEAT WATER PASSING OVER ITS TOP SURFACE. DOTTED LINE SHOWS PASSAGE OF WATER TO BE HEATED BY THE AWNING.
GLASS OR OTHER TRANSPARENT MATERIAL TO THE SOFFIT OF THE AWNING WHICH REFLECTS AS MUCH OF THE RADIANT HEAT FROM THE SUN AS POSSIBLE IN ORDER TO TRAP IT BETWEEN THE AIR CAVITY WITHIN THE AWNING AND THEREBY CREATE A CONVECTION CURRENT DRAWING AIR IN FROM THE AIR INTAKE AND DRAWING IT UP THE AIR CAVITY THROUGH THE FLOWING WATER AND INTO OUT THROUGH THE CHIMNEY.
RAIN WATER FILTERED THROUGH LANDSCAPE AND/OR COLD WATER FROM TOWER TO BE HEATED AND AERATED BY AWNING
GAS INTAKE INTO PIPE
GAS PIPE TO TRANSPORT GAS RELEASED CUE TO PHOTOSYNTHETIC REACTION WITHIN PLASMA GLAZING
GAS BUILD UP AREA
FLUID LEVEL
DARKER MEDIUM FLUID INCLUDING PHOTOSYNTHETIC COMPOUND
APPROPRIATE PLASMA GLAZING TO ROOF AND EXTERNAL WALLS TO ROOF GARDEN
RAINFOREST TYPE BIO SYSTEM OR OTHER APPROPRIATE BIO SYSTEM, WHICH PREFERABLY CLEANS, DETOXIFYS AND DETOXIFATES CIRCULATING AIR WHICH MAY PREFERABLY BE DRAWN INTO THE BUILDING VIA THE AIR CONDITIONING SYSTEMS
WATER DRAINING THROUGH THE SOIL ON THE ROOF GARDENS MAY PREFERABLY BE REUSED IN OTHER PARTS OF THE SYSTEM OR CONNECTED TO THE RAIN WATER SYSTEM.
WHEN APPROPRIATE, GREY WATER FROM THE BUILDING OR FROM THE BIO TOWER WASTE WATER TREATMENT SYSTEM MAY BE FED INTO THE SOIL IN ORDER TO IRRIGATE ROOF GARDENS AFTER PERCOLATION, THE GREY WATER MAY DRAIN INTO THE STORM WATER DRAINS RUNNING THE LENGTH OF THE BIO AWNINGS AS THIS WATER FLOWS IT WILL BE EXPOSED TO THE SUNS RADIATION AND, IF CONDITIONS ARE APPROPRIATE, ALGAE WILL GROW. PREFERABLY SUITABLE TECHNIQUES FOR PROMOTING THE GROWTH OF ALGAE THAT IS SUITABLE FOR THE PRODUCTION OF METHANE PRODUCTION IN ANAEROBIC DIGESTORS MAY BE EXPLOITED IF THE BIO TOWER INCORPORATES SUCH METHANE PRODUCING REVERSE TREATMENT IN ITS SYSTEM
PREFERABLY THE WATER WITH ALGAE DRAWN FROM THE BIO AWNINGS SHOULD BE ADDED TO THE DIGESTERS ONLY WHEN AT THE APPROPRIATE TEMPERATURE TO AUGMENT THE PRODUCTION OF BIOGAS. PREFERABLY, WHEN THE WATER WITH ALGAE IS TOO COLD TO AGREET THE SAME SYSTEM, THE ALGAE MAY BE SEPERATED FROM THE WATER AND ADDED TO THE SYSTEM IN ORDER THAT AUGMENT THE PRODUCTION OF BIO GAS.
WHEN APPROPRIATE, AIR EXPELLED FROM THE INTERIORS OF THE BUILDINGS MAY BE EXHAUSTED INTO ROOF GARDENS IN ORDER TO HELP PURIFY THE AIR.
WHEN APPROPRIATE, AIR FROM THE OF THE ROOF GARDENS MAY BE DRAWN INTO THE AIR INPUT OF THE AIR CONDITIONING SYSTEMS.
ORGANIC WASTE FROM RESTAURANTS ETC MAY BE FED INTO DIGESTERS, OF GARDENS AND PLANTING AND THUS FILTERED AND FURTHER DRAINED FOR USE IN OTHER PARTS OF THE SYSTEM.
DRAIN WITH ORGANIC WASTE DRAINED FROM KITCHENS OR THE LIKE
DRAIN TO RAIN WATER SYSTEM OR TO OTHER PARTS OF THE SYSTEM


ELECTRICAL OUT PUT FROM GENERATOR.
POWER MAY BE FED INTO A POWER GRID OR USED FOR ANY OTHER APPROPRIATE PURPOSE.
WATER PUMPED OR PSYPHONED TO OTHER PART OF THE SYSTEM
WATER MAY BE MADE TO RISE DUE TO THERMAL PSYPHONING OR MAY BE PUMPED THROUGH.
PIPE
(PLASMA)
HOT WATER OR FLUID FROM THERMAL HYDRO GLAZING MAY BE PIPED TO BIO TOWER TO GENERATE ELECTRICITY OR USED FOR ANY OTHER APPROPRIATE PURPOSE.
SUN'S RAYS
EXTERNAL LAYER OF GLASS ALLOWS HEAT AND LIGHT IN BUT PREVENTS HEAT FROM PASSING THROUGH IN THE OPPOSITE DIRECTION.
PLASMA GLAZING PANEL
INTERNAL LAYER OF GLASS REFLECTS HEAT AND ALLOWS LIGHT TO PASS THROUGH CREATING A HEAT TRAP IN COMBINATION WITH THE FIRST LAYER OF GLASS.
AN ELECTICITY GENERATING TURBINE POWERED BY THE UPWARD MOVEMENT OF AIR WITHIN THE CHIMNEY MAY BE EMPLOYED TO CONVERT THE HEAT TRANSFERED FROM THE SUN'S RADIATION WITHIN THE THERMAL HYDRO GLAZING INTO ELECTRICITY.
A VENTURI MAY BE EMPLOYED IF IT AUGMENTS THE SYSTEM OR IS OTHERWISE APPROPRIATE
HEAT IS RELEASED INTO AIR WITHIN CHIMNEY WITH ANY APPROPRIATE MECHANISM.
RISING AIR HEATED BY HEAT TRANSFERED FROM THERMAL HYDRO GLAZING
CHIMNEY

BIO TOWER



THERMAL HYDRO GLAZING (PLASMA GLAZING)
+ CAVITY
WINTER MODE



THERMAL HYDRO GLAZING (PLASMA GLAZING)
+ CAVITY
SUMMER MODE